THE IRON TRADE REVIEW

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EXTREME QUIET

CHARACTERIZES THE PIG IRON MARKET

And Some Low Prices Are Being Named.—Bar Iron Wage Scale Accepted.—Activity in Finished Lines.

The extreme quiet of recent weeks continues and there is considerable irregularity in pig iron quotations. There is no decrease in activity of the mills and specifications, especially from railroads and ship building interests, are very heavy.

Pig Iron Prices

In the Cincinnati market the appearance of some resale iron has had a rather demoralizing effect and prices have declined in that district so that $19 to $19.50, Birmingham, is freely quoted for No. 2 foundry spot iron. In the east, there is also a wide range of prices and in general it may be stated that prices are to a large extent nominal, as it is impossible to tell what would be the result if large buyers were to appear in the market. In spite of the reselling of some iron, foundries are busy and deliveries are being constantly urged.

Labor Shortage

There is still a marked shortage of labor at the Lake Superior iron mines. The shipments for the first three weeks of July have been considerably curtailed. The shortage in shipments, which can be attributed to the strike, will be more than 2,500,000 tons before the end of the month.

Bar Iron Scale

The acceptance of the new bar iron scale of wages, as reported by the conciliation board, insures industrial peace in that industry for another year. In merchant pipe, the leading interest has orders on hand amounting to three times the tonnage on order books at this time last year. In wire and wire products, fall business is very heavy, especially for fencing and nails. The demand for plates continues strong and specifications are very heavy. Rumors of cutting in prices of tin plates and sheets have been current but are not confirmed. Deliveries are, however, considerably improved.

Structural Material

The demand for structural material is very good and the outlook is that the orders taken by the leading interest will amount to about 50,000 tons for the present month. The contract for steel for three additional piers in New York has been awarded and in a few days the city will let contracts for the third lot of piers involving about 10,000 tons of steel. About 12,000 tons will be needed for the Manhattan terminal, New York City. The Panama railway is inquiring for 3,000 tons of rails, but new business in rails is of very small tonnages.

Coke and Old Material

Considerable difficulty has been experienced in keeping laborers at work in the coke regions, and the production has decreased somewhat. There is a scarcity of spot coke and prices are firm. Buyers of old material are rejecting it upon the slightest provocation. Prices are ragged and the demand very limited.

Steel Company Damaged.—A large part of the plant of the Cumberland Steel Co., Cumberland, Md., was destroyed by fire on the night of Aug. 18. The loss on buildings was not large but the company suffered by losing a major portion of its valuable machinery. The plant will be rebuilt at once. Six modern machines, which were to have been delivered a week before the fire, were delayed in transit, and these will be installed in the new building as the beginning of a modern plant.

LABOR SHORTAGE

STILL CAUSING TROUBLE AT THE IRON MINES.

Underground Operations Much Curtailed.—Statistics Showing Loss Due to the Strike.

Office of THE IRON TRADE REVIEW,
411 Providence Bldg.,
Duluth, Aug. 20.

The strike on the Mesabi range is a long way from being over and the present situation of labor scarcity in the underground mines gives every promise of continuing throughout the season though possibly in lessening degree. It is not a time for furnace men who receive their ore from underground properties to wonder why more ore is not being mined, for not an underground mine on the range has more than 80 per cent of the men it should have and certain mines have as few as a third of their former force now at work. The Steel Corporation is importing some men at Hibbing, Eveleth and Mountain Iron, but in all truth the quality of the labor and the conditions of importing it are not the most desirable.

The number of miners leaving the range is much decreased from that of the earlier days of the strike and now there are probably as many coming back as are going out, though at the end of last week 50 miners left Biwabik on one train. It is a strange circumstance that the miners seem to be shifting from one town to another, Nashwauk, for instance, having received last week nearly 25 men from Chisholm.

The open pit mines all over the range are getting out the scheduled amount of ore and are operating practically as before the strike except that they are well guarded by deputies. In the Hibbing district the underground mines of the Steel Corporation are working only day shift and with about two-thirds of the necessary miners. The Susquehanna mine has about one-third of its men, the properties of the Shenango Furnace Co. about three-fourths. At Mount Iron, the Iroquois mine is continuing to do better than last year. The Brunt is working with half of its men and, though threatened with trouble, the Mountain Iron pit is sending down a lot of ore. In fact

(Continued on Page 293.)

THE WEEK IN IRON CENTERS

PITTSBURG.

Pig Iron Market Extremely Dull and Prices are Nominal.

Office of THE IRON TRADE REVIEW,
521 Park Bldg., Aug. 21.

The Pittsburg market during the past week has been absolutely listless, without feature or incident, and with buyers not showing enough interest to make things worth while. Prices for the most part are purely nominal, and it is hard to tell what actual conditions would result should any fair inquiry be sent out. Not for two years have things been as dead as they are at the present time. The vacation period has a great deal to do with this condition, but the fact that consumers of raw and semi-finished material are bought up to practically the full extent of their requirements is the chief reason. In one or two cases bargain prices have been offered on special lots of iron, but even these have not been enough to excite interest. Improvement has been noted in sheets, but with it comes a report of a cut in prices by independent manufacturers. This has not been verified and cannot be run down, but if it is true it is the first instance in which price inducements have been made in order to secure new business. In all the heavy finished lines, mills are booked for many months ahead, and look upon the present lull as a relief from the high pressure of the past few months. A scarcity of semi-finished steel is noted all along the line, and despite the fact that the leading interest has been a heavy buyer of billets which have been applied upon its own contracts, this interest is still behind on shipments, although not to the extent it was a month ago. New business in shapes, plates and steel bars is very light, and delivery promises are far into the future. Specifications, however, are as heavy as at any time.

Pig Iron.—The only inquiry of any size in this market during the past week came from the east, and is for 1,000 to 1,500 tons of standard Bessemer for delivery before Sept. 15. One of the Westinghouse interests during the past week bought 500 tons of Bessemer at $22.25 furnace. Bessemer iron is scarce and prices, while they are purely nominal, are apparently a little bit stronger than they were last week. There is no inquiry for basic iron and $21 valley is quoted on both prompt shipment and deliveries during the remainder of the year. The only foundry iron moving is in carload lots, and $22.50 valley is the nominal market. One large consumer in this district reports that it has been offered standard Northern No. 2 foundry iron for shipment over the remainder of the year at $20 valley, but efforts to locate this seller have been unsuccessful. Forge iron is quoted nominally at $21 furnace. For delivery over the remainder of the year we quote as follows:

Bessemer, Valley	$22.25 to 22.50
Bessemer, Pittsburg	23.15 to 23.40
No. 1 Foundry, Pittsburg	23.75 to 24.00
No. 2 Foundry, Pittsburg	23.40 to 23.65
Gray Forge, Pittsburg	22.40 to 22.90
Basic, Valley	21.00 to 21.50
Basic, Pittsburg	21.90 to 22.40

Ferro-Manganese.—This market has been easy, with but little inquiry, and none of it for more than carload lots. Prices remain low and $58 Baltimore or $59.90 delivered Pittsburg is quoted on forward deliveries, and $60 Baltimore or $61.90 Pittsburg on prompt.

Imported 50 per cent ferro-silicon is quoted $106 Pittsburg, domestic 12 per cent, $36; 11 per cent, $35; 10 per cent, $34. The lower grades of imported ferro-silicon are quoted 50 cents lower. These quotations are applicable to Pittsburg territory. Western and central western prices, where the material is not subject to the competition of foreign grades are higher and in the east a little lower.

Plates.—Specifications against existing contracts are very heavy and the demand for deliveries is as great as at any time this year. The large manufacturers are not in shape to make very definite delivery promises on new business and but very little is being taken on. The two largest manufacturers are not in shape to promise shipment inside of three to four months and the miscellaneous current business now being placed with the smaller interests for reasonably prompt deliveries is at a premium of $1.50 to $2 over the 1.70c base of the leading interests. Consumers are having difficulty in getting their material and producers are getting an inadequate supply of semi-finished material, giving this as the chief reason for non-shipment. Prices are unchanged and we quote as follows:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.80c to 1.90c f. o. b. mill Pittsburg for prompt shipment, and 1.70c base Pittsburg on future deliveries. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c. A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than four inches in width at ends, narrowest end not being less than 30 inches, 0.10; circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gages under ¼-inch to and including 3-16-inch plate on thin edges, 0.10c; under 3-16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—A general improvement all along the line is noted during the past week. New business is better and specifications are good. A report is circulated that independent manufacturers are cutting official prices in some instances, but this cannot be verified. In only a few cases have reports been received where consumers of sheet products are not busy, and these exceptions are those whose output is seasonable and a lull expected at this time. We continue to quote the following official prices, subject to the usual discounts by the leading interests:

Black steel sheets one pass, cold rolled, Nos. 11-12, 2.20c; Nos. 13-14, 2.25c; Nos. 15-16, 2.30c; Nos. 17-21, 2.35c; Nos. 22-24, 2.40c; Nos. 25-26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 29, 2.75c; No. 30, 2.85c; galvanized Nos. 10-11, 2.65c; Nos. 12-14, 2.75c; Nos. 15-16, 2.85c; Nos. 17-21, 3.00c; Nos. 22-24, 3.15c; Nos. 25-26, 3.35c; No. 27, 3.55c; No. 28, 3.75c; No 29, 4.00c; No. 30, 4.25c; blue annealed, No. 10 and heavier, 1.85c; Nos. 11-12, 1.90c; Nos. 13-14, 1.95c; Nos. 15-16, 2.05c. Corrugated roofing, $1.90 per square for No. 28 painted, 2½-inch corrugation, and galvanized, $3.25 per square for No. 28.

Tin Plate.—During the past week rumors of price cutting of quotations on $3.70 base which is five cents per base box below the net rate of the leading interest have been circulated but not verified. This cut is largely on canners' sizes and is the first intimation since the recent high mark in which price cutting has been resorted to in order to secure business. The best delivery promises being made by the leading interest on tin mill products are six to seven weeks, and this is the best can be done if the

order is immediately put on the mill. We quote the following official prices:

Coke tin plate 100-pound basis, 14 x 20, $3.90 f. o. b. mill, Pittsburg district. Terms, 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material.—The only rail tonnage now moving as far as local interests are concerned is on light sections. The railroads have not gotten around to the point where they are ready to announce their requirements for next year and members of the commission appointed to investigate and report on a new section or outline quality of specifications have not held a meeting. Mills are not worrying at this time, feeling confident this matter will be determined in plenty of time before they actually need the business. Tonnages now on the books will keep them going to capacity for two to three months. Spikes have taken a tumble in price and standards are now quoted $2.15 to $2.20, Pittsburg and hand spikes $2.40 to $2.50. We quote as follows:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $40; 12-pound, $36 to $37; 16-pound, $35 to $36; 20-pound, $34 to $35; 25 to 45-pound, $33 to $34; angle splice bars for standard sections, $1.65; standard spikes, $2.15 to $2.20, Pittsburg; hand spikes, $2.40 to $2.50 Pittsburg.

Hoops, Bands and Cotton Ties.—This market is quiet, as it has been all summer, there being practically no new business placed at this time, the majority of contracts running well on toward the end of the year. Big buying is not expected until about the middle of the last quarter. Specifications against old contracts continue good. We quote as follows:

Hoops in carload lots, 2c; in less than carload lots, 2.10c; bands, 1.60c, base half extras as per standard steel. Cotton ties, 96½c per bundle.

Steel.—Only a few transactions in semi-finished materials are noted during the past week and these have been on small tonnages, on a basis of $30 Pittsburg for small Bessemer billets. The supply of semi-finished material is still short of requirements and although the leading interest has been a large buyer for several months and applied the material on its own contracts, it is still behind on deliveries, but not nearly to the extent it was two months ago, and conditions in this respect are improving each week. Sheet bars, random length, are nominally quoted at $31 Pittsburg or Youngstown.

Merchant Bars.—Since last week the Republic Iron & Steel Co., and the Western Bar Iron Association have accepted the award of the conciliation board to which the Amalgamated Association's Toledo scale was submitted. This clears off the labor situation until next July. Bar iron prices are a trifle lower than they have been and 1.70c, base Pittsburg for Pittsburg shipments is now being quoted on common bars. Quotations for western shipment remain at 1.60c base Pittsburg. The new steel bar business is very light, but specifications continue at a record breaking rate. We quote:

Common iron bars, 1.70c to 1.75c Pittsburg in carload lots and over, 1.75c to 1.80c in less than carloads; 1.60c base Pittsburg, plus freight to point of shipment on western deliveries; Bessemer steel bars, 1.60c, net for future deliveries; 1.85c to 1.95c out of stock; plow and cultivator, 1.60c, net; channels, angles, zees, tees, under three inches, 1.70c, all f. o. b. Pittsburg. The following differentials are maintained on steel; Less than 2,000 ponds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 50 per cent off in carloads, and 45 per cent in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. The price of planished and machine straightened tire is 1.80c, base, half tire extras. Iron finished tire up to 1½ inch and over to be sold on regular bar basis of 1.60c base, half extras, steel card.

Structural Material.—Ordinary delivery promises on shapes are six weeks to two months. New business is light, but specifications against old contracts are good and construction companies are hurrying mills for their material. The American Bridge Co. is taking the largest tonnages, as is expected, but independent companies are taking their regular proportions. There is but little new building work being figured upon in this district at this time. We quote:

Beams and channels, 15-inch, and under, 1.70c; over 15 inches, 1.90c; zees, 1.70c; tees, 1.70c; angles from three to six inches inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.80c base.

Wire and Wire Nails.—New business fell off to a considerable extent during July and the first part of August, this enabling manufacturers to catch up on old contracts but during the past week there has been a notable increase in the volume of new fall business, particularly on fencing and nails. Prices are unchanged and we quote as follows:

Wire nails, jobbers' carload lots, $2; retailers' carload lots, $2.05; less than carloads, $2.10; painted barb wire, $2.15 for jobbers in carloads; retailers in carloads, $2.20; and less than carload, $2.30, with 30c for galvanizing; plain wire, $1.85 for jobbers, and $1.90 by carload.

Merchant Pipe.—The leading interest at the present time has on its books over three times as much business as at the same time last year. The regular volume of new business continues without solicitation, and no definite delivery promises are being made. The leading interest, as well as independent manufacturers are filled up to such an extent as to be indifferent concerning now business, and independent manufacturers have been turning inquiries aside on account of inability to come anywhere near delivery requirements. We quote the following official discounts to consumers in large lots:

	—Steel— Black.	Galv.
⅛ and ¼ inch	65	49
⅜ inch	67	53
½ inch	69	57
¾ to 6 inches	73	63
7 to 12 inches	70	55
EXTRA STRONG PLAIN ENDS.		
⅛ to ⅜ inch	58	46
½ to 4 inches	65	53
4½ to 8 inches	61	49
DOUBLE EXTRA STRONG PLAIN ENDS.		
½ to 8 inches	54	43

Wrought Iron Pipe.—The following discounts on merchant iron pipe are being quoted:

RANDOM LENGTHS WITH THREADS AND COUPLINGS—CARLOAD LOTS.

	Black.	Galv.
⅛, ¼ and ⅜ inch	59	43
½ inch	62	51
¾ and 6 inch	67	57
7 and 8 inch	62	46
PLUGGED AND REAMED.		
1 to 4 inch	65	55
EXTRA STRONG PLAIN ENDS.		
⅛, ¼ and ⅜ inch	52	40
½ to 4 inch, inc	59	47
4½ to 8 inch	55	42
DOUBLE EXTRA HEAVY PLAIN ENDS.		
½ to 3 inch, inc	48	37

Boiler Tubes.—The demand for deliveries is as urgent as ever, and there are no features out of the ordinary in connection with this market. We quote as follows:

	Iron.	Steel.
1 to 1½ inch	42	47
1¾ to 2¼ inch	42	59
2½ inch	47	61
2¾ to 5 inch	52	65
6 to 13 inch	42	59

2¼ inches and smaller, over 18 feet, 10 per cent net extra.

2¾ inches and larger, over 22 feet, 10 per cent net extra.

Coke.—There is a good demand for both foundry and furnace grades of coke and the market as far as prices are concerned is in excellent condition. There is a marked scarcity of coke for spot shipment, for which the demand exists. On account of a shortage of labor and a scarcity of water at many of the operations in the region, produc-

tion has been light and last week the decrease in production for these reasons was approximatly 400 cars.

Spot furnace coke is quoted $2.70 to $2.75, at the ovens, but there is no active inquiry for contract furnace coke. There is a little inquiry for foundry coke for shipment through the winter months, September to March, and on this delivery $3.40 is being quoted. Spot foundry coke is quoted $3.25 at the ovens.

Old Material.—The scrap situation has not changed since last week and there is practically nothing being done. Consumers are taking advantage of the situation and are rejecting everything not exactly up to specifications. The Steel Corporation has rejected considerable material. This would indicate the ideas of the buyers as being toward a decline in prices and ability to get good stock at lower figures. At any rate, they are taking only No. 1 heavy melting stock. There is really not enough being done to get a fair line on the market. We quote the following nominal prices, gross tons, delivered Pittsburg district:

Heavy melting scrap, $17.50 to $18; rerolling rails, $18.75 to $19; bundled sheet scrap, $15 to $15.25; iron axles, $30.50 to $31; old iron rails, $23 to $24; No. 1 wrought scrap, $17.50 to $18; old car wheels, $24 to $24.50; low phosphorus scrap, $22.50 to $23; machine shop turnings, $14.50 to $15; axle turnings, $15.25 to $15.75, cast borings, $13 to $13.50; No. 1 cast scrap, $19.30 to $20.

EMPLOYERS' ASSOCIATIONS TO FEDERATE.

At the call of James W. Van Cleave, president of the National Association of Manufacturers, a meeting was held Aug. 19, at the Waldorf-Astoria, New York, of representatives from the various important manufacturing and employers' associations of the country, with the idea of forming a national federation. After a general discussion, organization committees were named and adjournment was taken until some date about a month hence when Mr. Van Cleave will call a second meeting for the formal launching of the new association. The meeting was held behind closed doors, but the objects of the proposed organization may be inferred from the call which stated that it would endeavor to "institute an educational campaign which should promote industrial peace and mutual good will between employers and employed." It is believed that by a common working body, trade organizations can secure large economies in many lines of present effort, such as in looking after hostile legislation through mutual channels, furnishing legal advice on industrial topics through a common legal bureau,

CHICAGO.

Railroad Buying and Specifying More Active—Pig Iron Dull.

Office of THE IRON TRADE REVIEW,
1362 Monadnock Block, Aug. 20.

With the background of trade somewhat more somber, if there be included in the view the financial situation, there are nevertheless this week a few indications of increasing activity in the metal markets here, such as have at times in seasons heretofore come at about this time of year. The fear or expectation of lower prices holds back or defers considerable business, coupled with the further view that prices in some lines are held to be high. If the retarding influences of those considerations and of the money market could be eliminated, the current developments seem to indicate that trade in the iron and steel industries might forge ahead again at something like the old pace. Perhaps the most encouraging development is that the railroad ordering is on the mend. The transportation companies are specifying on their contracts much more heavily than they did a month or six weeks ago and the inference seems warranted, taking into consideration the well-known attitude of the carriers, that the buying is no greater than it must be. In other words the absolute demands of the railroads are compelling more liberal purchases of material and the railroad buying constitutes the most important factor in the western metal markets. There have been larger specifications this week of all kinds of track material. By way of new business there is little doing in any branch. The Duluth, Mesabi & Northern road will construct at Duluth a new ore dock with 74 pockets on each side, which will require 5,000 tons of structural steel, the erection of which is to be done between January and June of next year and there has been other buying of shapes in this market to an aggregate of about 8,000 tons, making the week considerably more active than its immediate predecessors. But commonly there is only a routine activity in either iron or steel. Prices of old material continue to sag, but the steel market is unchanged and the mills do not appear to be gaining on their orders.

Pig Iron.—Carload business is the only type that is at all active. One contract of 500 tons is reported, but even it is exceptional. And the slight current trade is almost entirely for quick shipment. Prices are practically unchanged this week, but until the unsettled state of the market ends, both buyer and seller look for meager trading. The absence of orders is, therefore, not regarded as necessarily unfavorable. The rate of consumption is more vital and as nearly as can be perceived the decline in the melting here is not very marked as yet, though there has been some diminution. The present dullness may possibly drag along for some time, for the local furnaces are sold up well through the year. They have comparatively little tonnage available for shipment prior to Nov. 1, and that month and December are also well taken care of. The Inland Steel Co. expects to blow in its new furnace next month. That will take 100,000 tons out of this market, but the iron bought was mainly from the Mahoning valley and distributed among three or four furnaces, so that the blowing in of the furnace will not affect the local pig iron market. There is just a little indication of a better feeling among the foundrymen. They are said to be using more coke than a month or six weeks ago, which implies a larger melt of iron, scrap having gained nothing in point of activity. But the market cannot be called anything better than quiet. Prices may perhaps be a shade lower but are about the same as a week ago. Southern iron is still held at $20 for spot, $19 for fourth quarter, and $18 for the first half of next year, though the last quotation is purely nominal, local irons continuing on the basis of $24.50 to $25 for No. 2. We quote unchanged as follows:

Lake Superior Charcoal	$27.00 to 27.25
Northern Foundry No. 1	25.00 to 25.50
Northern Foundry No. 2	24.50 to 25.00
Northern Foundry No. 3	24.00 to 24.50
Southern Foundry No. 1	23.85 to 24.35
Southern Foundry No. 2	23.35 to 23.85
Southern Foundry No. 3	22.85 to 23.35
Southern Foundry No. 4	22.35 to 22.85
Southern No. 1 Soft	23.85 to 24.35
Southern No. 2 Soft	23.35 to 23.85
Southern Gray Forge	21.85 to 22.35
Southern Mottled	21.35 to 21.85
Southern Silveries, 4 per cent silicon	24.85 to 25.85
Southern Silveries, 5 per cent silicon	25.85 to 26.85
Southern Silveries, 6 per cent silicon	26.85 to 27.85
Jackson Co. Silveries, 6 per cent	29.40 to 29.90
Jackson Co. Silveries, 8 per cent	30.40 to 30.90
Jackson Co. Silveries, 10 per cent	31.40 to 31.90
Malleable Bessemer	25.00 to 25.50

Billets and Rods.—An inquiry has appeared in this market from the east for several thousand tons of rerolling billets and the prospective busines was turned down by the local producer because of inability to make desired deliveries. But generally new business is inconspicuous. The forging trade is well covered on contracts and is being well taken care of. Prices are without change as follows: Forging billets, $36 to $38 Chicago;

rolling billets, $20 Pittsburg; wire rods, Pittsburg, $37 for Bessemer and $38 for open-hearth.

Merchant Bars.—A large shipper of high grade merchant bar into this territory notes that its July deliveries here were the largest for any July in its history both in volume and in amount. It was not the clean-up business of the implement people at the end of the season, for August trade continues in the same satisfactory proportions. Formerly the July business of the implement, carriage and kindred lines was extremely light, but the all year activities of recent years has never been better illustrated than in 1907, a circumstance all the more striking because of the scare over crops earlier in the summer. There is a fair current business in both iron and steel bars, but transactions are limited to immediate deliveries. Iron bars have regained their firmness, but this is not regarded as in any way connected with the higher costs of production entailed by the recent wage settlement. Our quotations below are on carload lots, Chicago delivery:

Bar iron, 1.78c; soft steel bars and bands, 1.78c, half extras; soft steel angles, less than 3 x 3, 1.88c; hoops, 2.18c base, full extras; planished or smooth finished tire steel, 1.98c; iron finish, up to 1½ x ¼ inch, 1.93c base; iron finish, 1½ x 1½ inch and larger, 1.78c base; channels for solid rubber tire, ¾ to 1 inch, 2.28c, and 1⅛ inch and larger, 2.18c; smooth finished machinery steel, 2.18c; flat sleigh shoe, 1.83c; concave and convex sleigh shoe, 2.08c; cutter shoe, 2.36½c; toe calk steel, 2.33c; railway spring, 1.98c; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are irregular, 50 per cent off the list being asked on carload business, and 45 for less than carload lots. On iron and steel bars from local stocks, we quote as follows: Bar iron, 2.25c full extras; soft steel rounds, and square, 3-inch and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by ⅛ inch and larger, $2 per 100 pounds base; 4½ inches by 5 inches and 6 inches by 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $2 half extras; soft steel hoops, $2.50 full extras. Other sizes not mentioned above, $2 per 100 pounds base plus half extras.

Plates.—Mills are pegging along on their heavy contracts, booked earlier in the season, which are absorbing their output. Moderate inquiries are floating about, declined by the mills that are behind in filling orders, but finding takers among mills not quite so well weighted with business, or willing to take chances on squeezing in the tonnage. The situation is firm. Prices remain on the following basis:

Plates, ¼ inch and heavier, 6¼ to 100 inches wide, either universal or sheared, 1.70c to 1.90c Pittsburg base. For extras see Pittsburg report. Freight rate to Chicago, 18c per 100 pounds for carload lots, and 21c for less than carload lots. Jobbers' prices for shipment from local stocks are as follows: Tank steel, ¼ inch and heavier up to 72 inches wide, 2.20c; 3-16 inch up to and including 60 inches wide, 2.30c; 3-16 inch, 72 inches wide, 2.55c; No. 8 up to 60 inches wide, 2.50c. Flange steel, 25c extra; heads, 25c extra.

Sheets.—There is a good run of orders in sheets, particularly on the lighter sizes and the market shows some slight evidences of strength. At least one local mill, which several weeks ago quoted $1 premium over the Pittsburg scale, has been able to hold that advance since, the demand for early shipment being quite lively and being maintained without apparent diminution. Prices are without change as follows:

Black sheets, Nos. 8, 9 and 10, 1.90c Pittsburg; No. 28, 2.60c Pittsburg. Galvanized sheets, No. 28, 3.75c Pittsburg. Freight to Chicago, 18c per 100 pounds for carload lots, and 21c for less than carload lots. Jobbers' prices on carload lots and less from store are as follows:

No. 10, 2.50c to 2.55c; No. 12, 2.55c to 2.60c; No. 14, 2.60c to 2.65c; No. 16, 2.70c to 2.80c; Nos. 18-20, 2.80c to 2.90c; Nos. 22-24, 2.85c to 2.95c; No. 26, 2.90c to 3c; No. 27, 2.95c to 3.05c; No. 28, 3.05c to 3.15c; No. 30, 3.35c to 3.45c. Galvanized sheets, No. 10 to 20, 3.50c to 3.55c; Nos. 22 and 24, 3.65c to 3.75c; No. 26, 3.85c to 3.90c; No. 27, 4.05c to 4.15c; No. 28, 4.25c to 4.35c; No. 30, 5.40c to 5.45c

Structural Material.—There has been an improvement from the July 1 aspect of things, and there is a good deal of hurrying upon the moderate business closed. The new ore dock to be erected at Duluth, calling for 5,000 tons of shapes, is a new structure and will increase the shipping facilities by just its capacity, which will be two of the largest modern ore carriers at a time. About the ordinary run of bridge work is reported with prices firm as follows:

Beams and channels, 3 to 15 inches inclusive, 1.70c Pittsburg. For extras see Pittsburg report. Freight rate from Pittsburg to Chicago, 18c per 100 pounds for carload lots, and 21c per 100 pounds for less than carload lots. Quotations from store are as follows:

All angles, three inches and larger, including six inches, $2.10 per 100 pounds; angles, over six inches, $2.15 per 100 pounds base; beams, 3 to 15 inches inclusive, $2.10 per 100 pounds base; channels, three inches and larger, $2.10 per 100 pounds base. Less than carload lots are $1 a ton higher than foregoing prices.

Rails and Track Supplies.—A lull in the call for track supplies which materialized during June and July, seems to have disappeared. The railroads are calling more actively for track supplies of all kinds including rails, this past week than for several months. The recent developments among buyers in discussing new rail specifications, both in regard to ingot discard and chemical analysis are tending to defer rail orders for next year and the suddenly revived interest of the carriers in that respect may almost be said to make the present one of the experimental stages of the industry. Some experiments are being conducted and until they are completed the business for the new year may possibly drag. But for this year's track laying the specifications are accruing so rapidly that the mills are getting farther behind in shipments promised. Quotations follow:

Bessemer rails, $28 to $30; less than 500-ton lots, $32; open-hearth rails, $29; light rails, Bessemer, 30 to 45-pound sections, $34; 25-pound, $35; 20-pound, $36; 16-pound, $37; 12-pound, $38, and lighter sections down to 8-pound, $44.50, all f. o. b. mill. Track supplies vary in price according to quantity and delivery. On orders accompanying rail contracts for future delivery, we quote, f. o. b. Joliet: Angle bars, 1.65c; spikes, 2.25c; bolts with square nuts, 2.65c; with hexagon nuts, 2.80c. For carload lots or less, for prompt shipment, the following prices are asked: Angle bars, 2.25c to 2.75c; spikes, 2.40c to 2.50c; bolts with square nuts, 2.85c; with hexagon nuts, 3c.

Cast Iron Pipe.—Buyers of pipe are paying close attention to the pig iron market and refraining from closing any contracts for large tonnages of pipe. The quotations of the latter are unchanged and current transactions are limited to a few small orders. There is, however, some business of greater magnitude in sight, which is awaiting developments. We quote: Four-inch water pipe, $38.60; 6 to 12-inch inclusive, $37.60; gas pipe, $1 a ton higher.

Merchant Pipe and Boiler Tubes.—Week by week passes with little or no divergence from the previous

good conditions. The mills are slow in making shipments of both pipe and boiler tubes and not a little inconvenience is still occasioned the users through these mill delays. So long have these adverse conditions prevailed that they have almost become chronic.

We quote mill discounts, Chicago delivery, carload lots, as follows: On steel pipe, jobbers are allowed a concession of one point and 5 per cent additional from the schedule in force:

MERCHANT PIPE.

	—Steel— Black.	Galv.
¼ to 6 inches, inclusive.....	71.2	61.2

BOILER TUBES.

	Steel.	Iron.
2¼ to 5 inches, inclusive....	62.2	49.2

Mill quotations on iron pipe are from four to five points higher than above. A concession of one point from the following quotations is allowed by Chicago jobbers on carload orders for shipment from local warehouse stocks. We quote for less than carload lots as follows:

MERCHANT PIPE.

	Black.	Galv.
⅛ to ¼ inch.....	60	44
⅜ inch	62	48
½ inch	64	52
¾ to 6 inches.....	68	58
7 to 12 inches.....	64	49

Minimum prices for wrought iron pipe, carload lots or greater, from Chicago stocks, are as follows: ⅛ inch to ¼ inch, 55; ⅜ inch, 57; ½ inch, 59; ¾ inch to 6 inches, 64; 7 inches to 12 inches, 59. Boiler tubes from store are unchanged at 60 off for steel, 47½ for iron, and 42½ for seamless, base sizes, 2¼ inches to 5 inches.

Coke.—There is continued strengthening in the local coke situation, particularly as applied to the foundry trade. A month or six weeks ago, during the inventory season, shippers, who have a large number of contracts for coke with the pig iron melters, received some notices to withhold deliveries. It is said that with scarcely an exception these consumers of coke have again specified at the previous heavier rate of delivery. Prices are without change. Furnace coke is held at $2.60 to $2.70 ovens for spot shipment and Connellsville foundry product is quoted at $3.10 to $3.30 for either present or future delivery.

Old Material.—There is very little trading, both buyers and sellers withdrawing from the market in large measure. Even the railroads lists are scantier than usual. The Northern Pacific asks bids on some 800 tons of scrap, a considerably smaller tonnage than usual. One dealer notes that in three western lists he recently consulted there was not one rerolling rail. The lists from the more eastern roads, the tonnage of which, however, rarely reach this market, are for larger quantities. Prices have sagged a little further this week, 25 cents on some grades, 50 cents on others and some holding to previous quotations. But with the present light demand it is difficult to gage the underlying conditions. The lower tendencies are the more pronounced in the foundry grades and the trading that is current is mainly between the dealers themseves, who are taking the material against contracts previously assumed. Quotations as revised are as follows:

Old Car Wheels	$24.50 to 25.00
Old Iron Rails.....	21.00 to 21.50
Re-rolling Rails (3 ft. and over)	16.75 to 17.25
Old Steel Rails (3 ft. and under)	17.00 to 17.50
Light Section Relayers, 45 lbs. and under, subject to inspection...	30.00 to 32.00
Relaying Rails, subject to inspection	28.00 to 30.00
Frogs, Switches, and Guards...	15.50 to 16.00
Heavy Melting Steel.....	15.00 to 15.50

We quote net tons as follows:

No. 1 R. R. Wrought.....	$14.50 to 15.00
No. 2 R. R. Wrought.....	13.50 to 14.00
Knuckles, Couplers and Springs.	14.50 to 15.00
Shafting	17.00 to 17.50
Dealers' Forge No. 1.....	12.00 to 12.50
Pipes and Flues.....	11.50 to 12.00
No. 1 Cast, 150 lbs. and less...	16.50 to 17.00
No. 1 Mill	10.00 to 10.50
Mixed Busheling (Nos. 1 and 2)	10.50 to 11.00
Country sheet	8.00 to 8.50
No. 1 Boiler Cut.....	11.00 to 11.50
Boiler Punchings	14.00 to 14.50
Cast Borings	9.00 to 9.50
Mixed Borings, etc.....	9.00 to 9.50
Machine Shop Turnings	10.50 to 11.00
Railroad Malleable	16.00 to 16.50
Agricultural Malleable	14.50 to 15.00
Stove Plate and Light Cast Scrap	14.00 to 14.50
Old Iron Splice Bars.....	16.50 to 17.00

CLEVELAND.

Pig Iron Market Stagnant—Considerable Activity in Finished Lines.

Office of THE IRON TRADE REVIEW,
Browning Building, Aug. 20.

Iron Ore.—The movement of iron ore in the Superior ranges is still being retarded by the inability of the mining forces to produce sufficient tonnage at the upper lake ports to supply cargoes to the awaiting vessels. At the present time, the vessels are obliged to wait several days for their loads. Stock piles which had accumulated on the old ranges before the strike, have been cleared up by the active operations of the lower ports during the trouble. At the present gait of the movement, it is not believed that the estimated season's tonnage will be reached by several million tons, unless unusually favorable fall weather is encountered. The piling of stocks on Lake Erie docks by ore interests for future requirements has been begun.

Pig Iron.—The market in pig iron is in a state of practical stagnation. Inquiries being received for the remainder of the year are for 100 to 200-ton lots, and in the aggregate they amount to a very ordinary figure. There remains a little spot demand and a few sales of prompt iron have been made at the usual price of $23.50 Cleveland for No. 2 foundry. On the other hand, foundries appear to be well supplied with orders and there is no withholding of iron on contract. In several instances anticipations of shipments have been requested. A scarcity of spot No. 2 Scotch iron has appeared in this district, and this is attributed to the unsatisfactory working of some furnaces. The week has developed some inquiry for spot basic. No interest is noted in 1908 iron. We quote, f. o. b. Cleveland, as follows, the higher quotations being for third quarter delivery and the lower for fourth quarter:

Bessemer	$23.40 to 23.50
No. 1 Foundry.....	23.50 to 24.00
No. 2 Foundry.....	23.00 to 23.50
No. 3 Foundry.....	22.50 to 23.00
No. 2 Southern.....	23.85 to 24.35
Gray Forge	22.00 to 22.25

Coke.—Coke remains strong and active. Some interests are sold as far ahead as the second quarter of 1908. The sale of furnace coke at $2.75 ovens in the week as well as the refusal of an offer of $3 ovens for foundry coke are noted. Labor troubles continue to annoy operators. We quote furnace coke for last half delivery at $2.75 to $3.00 and foundry coke at $3.25 to $3.50.

Finished Material.—In finished lines active conditions generally are continuing, and new business is fairly abundant. Specifications are very heavy, shipbuilding and railroad interests both drawing largely upon their contracts and mill patrons generally are pushing deliveries. There is a good business in rails, especially for traction and city purposes, and several orders are pending. Jobbers' business for the months of July and August is less in volume than the corresponding months of a year ago, but this fact is not viewed with any undue apprehension. Last year these months were unusually brisk and this year up to the midsummer months there has been a heavy buying movement which is believed to have produced a temporary lull at this period before the resumption of active contracting. The sale of a considerable tonnage of bars, plates and shapes to fabricators in this district has just been closed by one interest, the former contract having expired, and it is stated that the tonnage compares favorably with past orders as an index of the expected future business of the buyers. Independent mills continue to furnish black sheets at very good deliveries, purchases having been made within the week on the basis of from one to three weeks. Plates show no loss in strength and premium business on tank steel is still being done without great difficulty. Railroad spikes are very easy and business is being taken by mills at the price of $2.00 for prompt shipment, The sale of from 30,000 to 40,000 sets of tire steel

for vehicle manufacturers was made in the current week. One large eastern mill finds its billet books in such a condition that it has been obliged to turn down orders for forging billets and is now practically out of the market.

Old Material.—The market continues weak and dull and prices in some grades have declined further in the week. The hand to mouth policy of buying is being maintained by the mills and very little tonnage is being disposed of in new business. There has been some cancellation by mills of unfilled tonnage on contracts and more is anticipated before Sept. 1, when many contracts will have run their course. This condition is expected to bring about a further slump in quotations. We have revised our prices and quote, f. o. b. Cleveland, gross tons, as follows:

Old iron rails	$21.50 to 22.00
Old steel rails (re-rolling)	17.50 to 18.50
Old steel rails (under 6 feet)	17.50 to 18.50
Old car wheels	22.50 to 23.50
Steel boiler plate	14.00 to 14.50
Steel axles	21.50 to 22.50
Malleable iron (railroad)	18.25 to 18.75
Malleable iron (agricultural)	16.00 to 16.50
Heavy steel	16.00 to 16.50
Country mixed steel	14.75 to 15.25
Low Phosphorus	21.50 to 22.50

We quote net tons as follows:

No. 1 R. R. wrought	$16.50 to 17.00
No. 1 busheling	14.25 to 14.75
No. 1 machine cast	18.00 to 19.00
Iron axles	24.00 to 25.00
Axle turnings	13.00 to 13.50
Machine shop turnings	11.50 to 12.00
Grate bars	14.50 to 15.00
Pipes and flues	13.00 to 14.00
Tank iron	12.50 to 13.50
Hoop and band iron	8.50 to 9.00
Sheet iron	7.50 to 8.50
Wrought drillings	11.50 to 12.00
Stove plate	14.50 to 15.00
Cast borings	10.75 to 11.25

CINCINNATI.

Resale Pig Iron a Factor—Market Irregular and Prices Lower.

Office of THE IRON TRADE REVIEW.
124 Government Place, Aug. 20.

Pig Iron.—Prices show an irregular and easier tendency. The little demand seems to be satisfied with resale iron at prices lower than furnaces are willing to quote. This resale iron is coming on the market in fairly good volume in lots of from 100 to 800 tons. It is difficult to ascertain the exact figures that can be done under such circumstances. It is currently reported that $18.50 Birmingham could be done for deliveries extending over the balance of the year and it is intimated that furnaces would not be likely to turn down such an offer. The market is quotable at $19 to $19.50 Birmingham for No. 2 foundry spot with the possibility of some to be found at $18.50. The lower grades are easier than No. 2. No. 3 foundry is obtainable at $18, No. 4 foundry at $17.50 and gray forge at $16.50, Birmingham. Northern iron is also slightly lower and for any iron available in the Ironton district $21.50 for No. 2 at furnace can be done. We quote for prompt delivery, delivered Cincinnati as follows:

Southern Foundry No. 1	$22.75 to 23.25
Southern Foundry No. 2	22.25 to 22.75
Southern Foundry No. 3	21.25 to 21.75
Southern Foundry No. 4	20.75 to 21.25
Southern No. 1 Soft	22.75 to 23.25
Southern No. 2 Soft	22.25 to 22.75
Southern gray forge	19.75 to 20.25
Northern No. 1 foundry	23.20 to 23.70
Northern No. 2 foundry	22.70 to 23.20
Northern No. 3 foundry	22.20 to 22.70

There is no inquiry for forward delivery. Prices for fourth quarter and next year are merely nominal. Buyers are showing no interest in forward business, or have apparently decided to hold off. The resale iron that is coming out now is thought to be a profit taking action on the part of some consumers who have iron due them at $18.50 Birmingham and are willing to take a profit on their iron now, buy from hand to mouth through the fourth quarter, and possibly do better than by letting deliveries come along and take the iron. The situation is peculiar in some respects in that melters are calling for iron so steadily, and those furnaces that are behind on their deliveries are being urged constantly to ship iron.

Another feature of the situation is the lists of iron in furnace yards or unsold for nearby delivery that are being sent out to the pig iron agents. These lists show only light tonnages of odds and ends, high silicon, low grades, etc. The furnaces are putting these lists in the hands of several agents in the same territory and the efforts made by the selling agents in circularizing and through traveling men give the appearance of much more iron offering than really is the case. We quote for last quarter delivery delivered Cincinnati as follows:

Southern Foundry No. 1	$22.25 to 22.75
Southern Foundry No. 2	21.75 to 22.25
Southern Foundry No. 3	21.25 to 21.50
Southern Foundry No. 4	20.75 to 21.00
Southern Foundry No. 1 Soft	22.25 to 22.75
Southern Foundry No. 2 Soft	21.75 to 22.25
Gray Forge	19.75 to 20.00
Northern Foundry No. 1	23.20 to 23.70
Northern Foundry No. 2	22.70 to 23.20
Northern Foundry No. 3	22.20 to 22.70

Finished Material.—There is not much doing in the way of contracts, but specifications on contracts are satisfactory. The retail branch of the business is good and jobbers are having a good run of small orders to fill. On retail business the following quotations prevail:

Angles, 3 x 3 and over, 2.15c to 2.25c; beams and channels, 15 inches and under, 2.15c; small angles and architectural channels, 2.10c base; plates ¼ inch and heavier, 2.10c; 3-16 inch 2.20c; No. 8, 2.20c; sheets (blue annealed) No. 10, 2.30c; No. 12, 2.35c; No. 14, 2.40c; No. 16, 2.50c; box annealed sheets, No. 18 and 20, 2.65c; Nos. 22 and 24, 2.75c; Nos. 25 and 26, 2.80c; No. 27, 2.85c; and No. 28, 2.95c. Iron and steel bars, $2 base; boiler tubes, 62 per cent off base; turnbuckles, 45 per cent off, rivets, 3.15c base; cold rolled shafting, 45 per cent off list; steel tire, 2.10c base.

Coke.—The market is rather quiet. There is but little change in price. Spot coke is still easy for furnace grades in all districts. Foundry coke is steady in tone with light buying. Labor in the coke districts is scarce and oven operations are somewhat hampered. Prices in the leading coke producing districts are as follows:

Wise County, Va., Furnace Coke, prompt shipment	$2.25 to 2.35 per ton
Wise County, Va., Foundry Coke	3.00 to 3.25 per ton
Pocahontas Furnace Coke, prompt shipment	2.50 to 2.65 per ton
Pocahontas Foundry Coke	3.00 to 3.25 per ton
Connellsville Furnace Coke, prompt shipment	2.40 to 2.50 per ton
Connellsville Foundry Coke	3.00 to 3.50 per ton
New River Foundry Coke, prompt shipment	3.00 to 3.50 per ton
New River Furnace Coke, contract	2.50 to 2.75 per ton

Old Material.—The market is quiet and easy. There is but little or no demand from melters. Some quotations are lower. We quote f. o. b. Cincinnati:

Old No. 1 R. R. wrought net tons	$16.00 to 17.00
Cast machine and fdy, net tons	18.50 to 19.00
Old iron rails, gross tons	22.00 to 23.00
Old steel rails (re-rollin-' gross tons	18.00 to 19.00
Old short lengths, gross tons	19.00 to 20.00
Old iron axles, net tons	25.00 to 26.00
Heavy melting scrap, gross tons	18.00 to 19.00
Stove plate, net tons	14.00 to 15.00
Wrought turnings, net tons	12.00 to 13.00
Cast borings, net tons	10.00 to 11.00
Car wheels, gross tons	23.00 to 24.00

NEW YORK.

Pig Iron Prices Irregular and Business Light—Mill Situation Stronger.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Aug. 20.

Pig Iron.—Although the eastern market continues in a condition approaching stagnation, there has been sufficient activity during the past few days to establish the fact that prices, while slightly lower, are extremely irregular and range within surprisingly wide limits. On a lot of 1,500 tons of No. 2 plain foundry iron, purchased for last quarter delivery in the immediate vicinity of New York, very low prices were secured, as was the case with the larger tonnage bought by a pipe interest a little earlier. This was the only important transaction of the week in foundry iron, but on moderate lots of No. 2X in several instances furnaces were able to secure their price of $22, and one small

sale was made at $23 furnace. The last sale, however, does not represent the extreme limit of the market. On some important business in basic iron low prices were made during the week, and it is understood that on some 12,000 or 15,000 tons the average was well under $21 furnace. Jackson County silvery, 8 per cent, sold into this territory a few days ago on the basis of $30 furnace.

Prospects for fall business vary in different sections of the east. Through New England, it is stated, producers generally will need but little more iron this year, as they have bought liberally and are counting on the recession in business to string out their purchases over a longer period than originally anticipated. In this field, however, some of the largest melters will have to buy a considerable tonnage. About New York consumers are not so well supplied and at least moderate purchasing is to be expected before long. Because of the condition of the money market, collections are difficult and the smaller foundries in particular are being watched. These report, in turn, that they are meeting with increasing delay in securing payment for their castings. They are busy now, but look for less active conditions in the fall.

Our quotations, New York delivery, are as follows:

Northern Foundry No. 1	$22.00 to 22.50
No. 2X Foundry	21.25 to 21.75
No. 2 Plain	20.25 to 20.75
No. 2 Southern Foundry	23.50 to 25.00
Basic	20.00 to 21.00

Ferro-Manganese.—There is little change from the situation reported a week ago, prices being on the same level, $61 to $62 for spot at seaboard, and $59 to $60 for future delivery. Inquiries for moderate lots are frequent and some business is being closed.

Finished Materials.—The situation, so far as mills are concerned, is evidently stronger. The billet situation is strong by virtue of the recent heavy purchases by the Steel Corporation. In structural lines the week has witnessed several lettings of interest. The receivers of Milliken Bros., it is announced, in addition to taking a number of small contracts, have taken an important order to supply all the ornamental iron work for the Singer and Bourne building additions in this city. R. P. and J. H. Staats, who secured the general contract for three additional piers at the letting a week ago, have given the McClintic-Marshall Construction Co. the contract for the 13,000 tons of steel required. In a few days the city will award contracts for the third lot of piers, involving about 10,000 tons of steel. About 12,000 tons will be required for the Manhattan terminal at Sixth avenue and Thirty-third street, contracts on which are shortly to be let by the Hudson Co. About 1,800 tons for an opera house on Central Park West will be let in the near future. Bookings of the American Bridge Co. during the week include 2,500 tons for the 'Lawyers' Title building. About 1,500 tons of steel will also be furnished by this company for Pennsylvania bridges. For the week total bookings of this interest have been about 7,000 tons, and indications are that the month will show 50,000 tons. Machinery is being installed in the additions to the Elmira plant of this company, which plant will then have a capacity of 6,000 tons annually. The Panama railway is inquiring for 3,000 tons of rails, and the Erie is asking bids on a draw bridge across the Hackensack.

In bar iron there is slightly more activity. Plates are quiet, though occasionally an attractive tonnage develops. Otherwise the situation is unchanged. We quote: Angles, 3 to 6 inches x ¼ inch and heavier, 1.86c; beams, 3 to 15 inches, 1.86c; tees, 3 x ¼ and heavier, 1.91c; plates, carloads, tank, 1.96c; marine boiler, 2.26c; bar iron, 1.86c; soft steel bars, 1.76c; sheets, No. 28, black, 2.60c.

Old Materials.—Rolling mill stock is in slight demand. There is a fair market for steel scrap at the figures quoted below, but large quantities are coming out, mills are well supplied, and the tendency is to demand concessions. Cast scrap, in sympathy with the trend of the pig iron market, is weaker and prices are lower. Cast borings and stove plate have slumped badly of late. No large sales are reported, as buying is of the hand-to-mouth sort, with railway lists unusually small. New York delivery prices are as follows:

Old iron rails	$24.50 to 25.00
Old steel rails, rerolling	18.00 to 18.50
Relaying rails	27.00 to 27.50
Old car wheels	23.50 to 24.00
Old iron car axles	27.50 to 28.00
Old steel car axles	19.00 to 19.50
Heavy melting steel	14.50 to 15.00
No. 1 railroad wrought	17.00 to 17.50
Iron track scrap	16.00 to 16.50
Wrought pipe	12.50 to 13.00
Cast borings	11.00 to 11.50
Wrought turnings	12.50 to 13.00
Heavy cast scrap	17.00 to 17.50
Railroad malleable	16.50 to 17.00
Agricultural malleable	15.00 to 15.50
Stove plate	13.50 to 14.00
Grate bars	13.00 to 13.50

The Newcastle works of the Carnegie Steel Co. have closed down for absolutely necessary repairs, which will probably require the remainder of the month for completion.

BUFFALO.

Market is Dull and Sales Are for Small Lots—Foundries Not Rushed.

Pig Iron.—The market is dull and attracting very little attention. Furnaces quote at the old prices, but the sales are so few that there has been little opportunity for changes in prices one way or another. The tendency is downward, so far as prices are concerned, but, as it is expected that business will be more active within a few weeks, no sacrifice prices are reported. Producers are determined to keep prices where they have been for a time, at least until first quarter quotations are issued.

Practically the only call is for special grades in small lots which are required by foundries for various purposes. The largest sale reported within a week was for prompt delivery, one of the furnaces having 500 tons of special iron to offer. This lot was disposed of late last week. This week opened very quietly and the indications point to a dull week in the trade. Foundries are not rushed at this time, but say they have plenty of business in sight for later in the season. Interest in the market will probably be lacking until early in September, when the larger consumers are expected to come around with inquiries for prices on next year's deliveries.

For last quarter delivery we quote as follows:

No. 1X Foundry	$23.75 to 24.00
No. 2X Foundry	23.00 to 23.50
No. 2 Plain	22.50 to 23.00
No. 3 Foundry	22.75 to 23.00
Malleable Bessemer	23.00 to 23.50
Gray Forge	22.00 to 22.50
Charcoal	27.00 to 27.50

ST. LOUIS.

Limited Demand for Pig Iron and Lower Prices.

August 19.

Pig Iron.—Last week No. 2 was quoted from 50 cents to $1 less than the previous week, prices now conforming more to quotations reported from other pig iron centers. There is not much demand for quick shipments, and some furnaces are offering slight concessions to move an accumulated stock of silvery, also No. 3 and No. 4 foundry. There is very little No. 1 soft and some furnaces are in arrears in delivering that grade on contract. There is not much inquiry for last quarter iron, but a buying movement is looked for, as there are a great many melters in this territory who have not fully covered their requirements for that period. Very little iron has been sold for delivery next year, and buying for that delivery will have to commence soon,

it is confidently predicted. Our quotations for immediate delivery, f. o. b. Birmingham, to which freight of $3.75 is to be added, follow:

No. 1	Southern	$20.00 to 21.00
No. 2	Southern	19.00 to 19.50
No. 3	Southern	18.50 to 19.00
No. 4	Southern	18.00 to 19.00

Coke.—There was no change in coke prices last week, quotations remaining at $3.35 and $3.60 for 72-hour Connellsville, f. o. b. ovens, to which freight of $2.80 to East St. Louis, and $2.90 to St. Louis is to be added. The supply seems to be equal to the demand. A shortage of cars is reported in the West Virginia field for shipments to southwestern territory, but this has not affected shipments to the north and northwest.

Finished Material.—The contract was let last week to the Brown-Ketcham Iron Works of Indianapolis for structural iron for the new Bank of Commerce building, to be erected at Broadway and Pine street, St. Louis. About 2,100 tons will be required. In the western field, the Kansas City Structural Steel Co. is reported to be taking a majority of contracts. The market is reported in good shape, with specifications coming in freely, but the demand is not so heavy as six weeks ago. St. Louis steel men are speculating on the influence upon their trade in competition with Chicago and other markets by the building of car shops to cost approximately $1,500,000 for the Frisco railway system at Springfield, Ill. Work on these shops was begun last week. The shops will be ready for occupancy about March 1, 1908, and are to be model in every particular, embracing a tract of 300 acres.

The largest of the six buildings will be the machinery and erecting shops, 566 x 173 feet. The other building will include a forge shop, 245 x 102 feet; boiler and tank shop, 344 x 117; paint shop, 183 x 182; coach shop, 303 x 207; and power house, 117 x 160 feet. There will be an 80-foot transfer table, with a 1,338-foot runway. The runway will be operated by the third rail system, with an electric running capacity of 800 feet per minute. The boiler house will be 200 feet high, and will be built of reinforced concrete and equipped with six boilers with a combined capacity of 2,400-horsepower. The plant is the property of the Frisco Car & Engineering Co., a Missouri corporation, which is controlled by the Frisco. The Frisco will build in Springfield its own steel and wooden cars, and concentrate all of its repair works there. Six hundred men will be employed when the plant is completed.

Old Material.—Dealers report the market so demoralized that sellers hardly know what prices to ask, or buyers to offer. No improvement is looked for until cooler weather. Our quotations follow:

	GROSS TONS
Second-hand Relaying Rails, according to time of delivery	$29.00
Steel rails (less than 3 feet)	15.00
Car wheels	21.00
Iron rails	22.00
Re-rolling steel rails	16.00
Heavy melting steel	15.00
Country steel mixed	12.00
	NET TONS
No. 1 R. R. wrought	$15.00
No. 2 R. R. wrought	14.00
Iron splice bars and fish plates	16.00
Iron car axles	22.00
Steel car axles	19.00
Iron shaftings (3 to 6 inches)	18.00
Country wrought	12.00
Locomotive tires, smooth inside	15.00
Pipes and flues	12.00
Heavy machinery	15.00
R. R. cast (less than 300 pounds)	14.50
No. 1 Busheling	13.00
No. 2 Busheling	12.00
Boiler sheet and rings	12.00
R. R. cast borings (free of inferior quality)	10.00
R. R. wrought turnings	13.50
Machine shop turnings (free from brass)	10.00
Railroad malleable	15.00
Agricultural malleable	14.00
Cast stove plate	11.00

BIRMINGHAM, ALA.

Pig Iron Dull, But Prices Firm—Scarcity of Labor.

August 19.

Alabama pig iron continues dull. The manufacturers are firm and are looking forward to an early improvement in conditions all around. Almost all of the probable make for the fourth quarter of this year has been disposed of and some sales have been made again recently for the first half of the coming year, though not enough to brag of. The make is holding its own. The railroad facilities are as good as could be expected except in the raw material fields.

Labor is reported scarce again. Much of the foreign labor brought into this district in the past twelve or fifteen months appears to be restless, some sort of dissatisfaction having arisen. Around the iron industries, there is need for more help. Rolling mills are also in need of experienced labor, 20 puddlers at least being needed at the Gate City mills.

Steel is still in active operation. The production of 90-pound steel rails, announced during the past week, has attracted additional attention to the district. The steel plants in this state are still working on full time. Much progress is being made on the new plant at Ensley. Cast iron pipe shipments are heavy. St. Louis and other places in the west are now receiving considerable cast iron pipe from this section. Soil pipe is quiet yet, though an improvement in conditions is looked for in the near future.

BRITISH IRON MARKET.

General Conditions Excellent—Busy Autumn Expected.

August 10.

Generally, the pig iron market shows marked strength. The Board of Trade returns have had a very healthful influence upon prices which still remain about the same for Cleveland. Derbyshire and Northamptonshire are slightly easier, apparently because sellers have become a little tired of doing no business, and made concessions to tempt orders. But this is really unnecessary, because everybody has his book full of orders. Naturally buyers seize this opportunity to get easier rates which in these times are few and far between. So many people have been holding off the market lately that buying is likely to commence in earnest next month. The position of coal is having a great influence. Local colliery proprietors have already decided to put up prices 2 shillings at the beginning of September, and everybody agrees that there is an autumn and winter coal boom ahead. Stocks at Middlesbrough continue to diminish, the latest reports showing a store of 207,741 tons, which is about 5,000 less than on the previous day.

The general condition of trade is excellent, a state of things which, occuring in July, is generally regarded as indicating a busy autumn. There are better reports from makers of galvanized hollow ware, one firm having just commenced operations on an order for 30,000 dozen galvanized buckets. Most of these establishments now can see their way comfortably to the end of the year. Steel prices are a shade easier, mainly on account of the large output. German makers are still approaching British consumers of bars and billets, apparently with the object of keeping in touch with them when the time arrives to get rid of their surplus output.

Both the Northern and Midland wages boards have just issued their bimonthly reports, the effect of which, as everybody expected has been an advance to iron workers of 2½ per cent. But what was not expected was that the advance would be so slight. In the Midlands the rise is only from £7 7s 0d to £7 7s 6d .27. It will be seen that the workmen narrowly escaped missing the expected advance.

Jefferson furnace, Jackson County, O., is shortly to be blown in.

METAL MARKET.

NEW YORK.

August 20.

Copper.—There is little change in the situation, each week being practically a repetition of that preceding. With the volume of current business very limited there is considerable pressure to sell, with consequent price concessions, which do not, however, result in any stimulation. Stocks in manufacturers' hands are holding out better than expected and it is difficult to foresee any immediate change from present stagnant conditions. Current prices, largely nominal, are on the following level: Lake, 18¾c to 19¼c; electrolytic, 17¾c to 18¼c; casting, 17½c to 18c. The British market was in the hands of operators during the past week, but rallied from a severe decline at the close.

Pig Tin.—A little better tone prevails in the local market, a sharp rally having followed the heavy break in prices which saw its culmination about a week ago. Consumers are manifesting more interest and some business is being done. The supply is more satisfactory. Prices are from 37¼c to 37¾c, according to delivery.

Pig Lead.—Desilverized is still held by the leading producer at 5¼c, though from St. Louis come reports of business on a straight 5c level, with an occasional instance of shading. The market is unchanged both here and abroad.

Spelter.—Because of the light demand, coupled with the eagerness of producers for what little business is going, prices are again slightly lower. New York quotations are 5.75c to 5.80c; St. Louis, 5.60c to 5.65c.

Antimony.—There is no improvement in the market, quotations being about as follows: Cookson's, 10¾c to 11¼c; Hallett's, 10¼c to 10¾c; ordinary brands, 9¼c to 9¾c.

CHICAGO.

Chicago, Aug. 20.

Copper.—The brass foundries in this territory are not buying material with the same freedom as a year ago and are believed to be consuming not quite so much, there being some notable exceptions to this statement. Prices of copper in Chicago are just where they were a year ago—18½ to 19c for Lake, 18 to 18½ for casting and 18¼ to 18¾ for electrolytic. For the past week there has been a decline of about a cent. The sharp advance in prices last winter deferred considerable business involving large tonnages of copper wire, the makers of which had been running their mills double time last autumn but recently were not operating up to normal time. Just as soon as the market becomes settled large tonnages of copper will be placed. While negotiations between several of the largest consumers and the Big Four are in progress in the east, as to prices on contracts, things are no more definite here. There is quite a business in sight in carload lots, but the consumers in the light of the decline are getting quotations, then piecing out by means of small purchases. From the extent of the inquiry there is prospect for a large business as soon as stability of quotation is established.

ST. LOUIS.

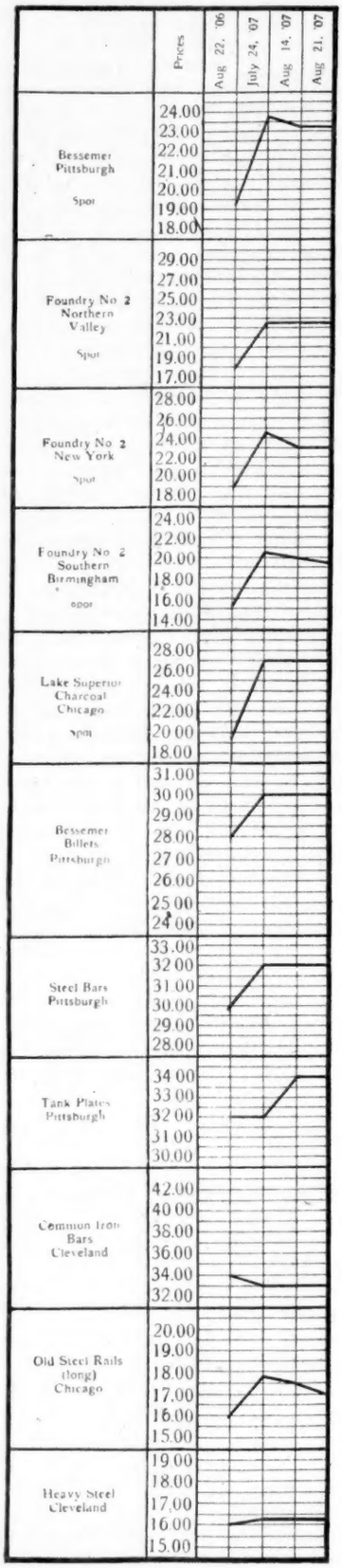
August 19.

Lead and Zinc.—A large number of mines are closing down in the Joplin district because of the short-sighted policy of producing zinc ore to the fullest capacity to the detriment of prices. Instead of a systematic restriction of output to mantain an equilibrium of prices, at a point of profit, as was done in 1905, operators have increased their output until a reserve stock of approximately 6,000 tons is forcing prices downward at an unreasonable rate. The smelters have endeavored to take care of the ore, but can no longer carry the excessive load. The highest price paid was $48 per ton for four tons of zinc, but the general high price was $47 to $47.50 per ton on an assay basis of from $43 to $46 per ton of 60 per cent zinc, with prospects for a weaker market next week. As high as $65 per ton for at least one bin of lead, and another bin of a million pounds was sold at $63, but the closing offering was only $56 per ton for next week's delivery, the cut corresponding to a drop reported in pig lead.

BUY TIN PLATE PLANT.

The newly incorporated Washington Tin Plate Co., Pittsburg, has purchased the Washington, Pa., plant of the McClure Co. of Pittsburg, and the formal transfer will be made about Sept. 1. John J. O'Connor, sec'y-treas. of the McClure Co. is president of the new organization and Richard W. Martin and W. W. Martin are directors. As soon as the plant is put in operation by its new owners, the nominal capitalization of $10,000 will be increased to $300,000. The jobbing business of the McClure Co. at Pittsburg will remain under the old management. Edward T. McNulty manager of the Washington plant, will continue in that capacity.

PRICE CHART.



LABOR SHORTAGE.

(Continued from 283.)

the burden of the Duluth, Mesabi & Northern shipments come from the Hull-Rust, Morris and Mount Iron pits. The underground properties of the Republic Iron & Steel Co. are very short handed as are also the mines of Pickands, Mather & Co. The mines operated by Joseph Sellwood and up to last week operated with immunity were interfered with and a number of men left the Morrow and Cass. This is the time of year, of course, when there is always a scarcity of labor and the present shortage was undoubtedly enhanced by the fact that other employment was so readily available in the harvest fields.

The labor troubles on the docks are entirely settled, but the routine of shipments is far from being in good working order. The boats are still more or less bunched, a great deal of coal is being brought up and dispatch at the coal docks is not of the best. Owing to no fault of the dock men, some grades of bituminous coal are well stocked up on the docks and for the ore carriers the ore is not coming down in the best of shape. Figures are now available showing with considerable accuracy just what the strike has done to the shipments from the head of the lakes.

At the time of the beginning of strike the total shipment for the season from the three docks at the head of the lakes was 11,223,885 tons as against 9,219,198 tons in 1906, showing a gain up to that time of 2,004,687 tons. The total for the season up to the present time from the same ports is 14,309,787 tons as compared with 13,666,012 tons a year ago, so that the gain is now but 643,775 tons. Had the strike not intervened an additional gain of 900,000 tons at least would have been made in the month from the middle of July to the middle of August, so that instead of a gain of 643,775 tons at this time we should have a gain of practically 3,000,000 tons, which shows that the loss due to the strike has already amounted to about 2,300,000 tons.

The figures for the first two weeks of August are given below and also the shipments during the week ending July 13 to show the comparative rate at which the ore is being moved now and just before the strike.

	Week ending July 13.	Week ending Aug. 7.		Week ending Aug. 14.		Total to date.	
		1907.	1906.	1907.	1906.	1907.	1906.
Duluth	540,681	392,886	397,116	420,887	246,502	6,382,753	5,878,674
Two Harbors	360,009	168,308	251,476	306,466	313,719	4,078,618	4,577,194
Superior	228,723	300,279	202,297	298,444	218,648	3,848,416	3,210,144

SEASON COMPARISON.

Duluth, increase	504,079
Two Harbors, decrease	498,576
Superior, increase	638,272

From this it may be seen that Two Harbors was hardest hit because so many of its tributary mines are underground properties, and also it is shown that rather unexpectedly the Great Northern has lost the least.

TEST VANADIUM STEEL.

In the presence of several automobile manufacturers from Cleveland, Detroit, and other points, the United Steel Co., Canton, O., Aug. 15, made another very successful heat of vanadium steel, amounting to about 30 tons. After proper heat treatment, test pieces from the last heat of vanadium steel made by this company showed the following results:

	A	B
Tensile strength	228,375	200,000
Elastic limit	228,375	185,000
Elongation, per cent		11
Reduction of area, per cent		56

Remarkable tests were also secured from this heat of steel, in the way of resistance to crystalization. Vanadium steel is rapidly being adopted by the automobile manufacturers for the high grade work, necessary to produce a modern car. This last heat was made for the Ford Motor Co., of Detroit.

Good Financial Showing.—In a circular issued by Peabody, Houghteling & Co., Chicago, in connection with the offer of $900,000 first mortgage 6 per cent serial gold bond issues by the Cleveland Furnace Co., Cleveland, a statement of the financial account of the company is given. After the issuance of the contemplated bond issue and the completion of furnace B now under construction, the approximate condition of the company is shown to include total resources of $2,842,453.97, against which there are liabilities of $109,510.02, consisting entirely of current accounts not yet due and the $900,000 in bonds. The income account for the year ended March 31, 1907, exhibits net earnings of $452,261.53, against $255,269.80 for the corresponding year ended March 31, 1906, and $122,514.72 for the year ended March 31, 1905.

To Increase Capacity.—Preliminary plans are now being made to increase the open-hearth capacity at the Homestead plant of the Carnegie Steel Co. No appropriation has yet been made for the work, but the financial board is expected to take action within a short time.

COLORADO FUEL & IRON CO.'S REPORT.

Gross earnings of $23,792,298, an increase of $1,472,253 over the preceding year, are shown in the annual report of the Colorado Fuel & Iron Co. for the fiscal year ended June 30, 1907. The operating expenses, however, reached $21,196,254, which exceeds the previous year's total by $1,435,237 and in consequence reduced the net earnings to $2,596,044 or an increase of only $37,016 for 1906.

The earnings and expenses in detail for the past four years follow:

Earnings—	1907.	1906.	1905.
Iron dept.	$13,927,108	$12,454,643	$9,171,202
Indust. dept.	9,454,223	9,499,317	9,073,657
Denver retail dept.	410,967	366,085	363,296
Miscellaneous			6,862
Total	$23,792,298	$22,320,046	$18,615,017
Operating expenses—			
*Iron dept.	$12,180,037	$10,883,679	$ 8,395,372
Indust. dept., full	8,370,628	8,264,273	8,144,006
Denver retail dept.	383,205	342,230	344,820
Total	$20,933,870	$19,490,182	$16,884,198

*Includes excess of Lake Superior ore.

Tonnage statistics (in tons of 2,000 lbs.) compare as follows:

Fuel department production—	1907.	1906.	1905.
Coal	4,844,461	5,056,378	4,504,753
Coke	992,661	1,095,133	948,553
Iron department production—			
Iron and steel	1,994,410	1,900,168	1,444,177
Iron ore	893,453	803,383	483,571
Limestone	417,611	369,921	213,007

Truce Is Declared.—A truce has been declared in the contention that has been waged over brick freight rates between the brick manufacturers and the railroads. The interstate commerce commission has granted a petition, presented jointly by the two interests, to postpone the date when its ruling for uniform rates is effective, from Aug. 15 to Jan. 1, 1908. This will enable all orders contracted for this year's delivery to be filled before the new rates are effected. In the meantime, the brick manufacturers and the railroad officials will confer and attempt to satisfactorily adjust the rates. The railroads under the decision requiring a uniform freight rate for all bricks adopted the fire brick rate, which is the highest of the entire schedule, thereby practically making an advance of the rates.

Heavy Imports and Exports.—The imports of foreign pig iron through the port of New York in the month of July reached 80,476 tons, the heaviest single month's shipment in a number of years. From England 73,029 tons arrived. In iron and steel exports the shipments through New York and other eastern seaports was 63,173 tons.

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THE IRON AND STEEL SITUATION.

For the first time in more than two years, really serious doubts are entertained as to the future of the iron and steel trade. Beginning with a sudden revival, late in 1904, from the depression which began in the latter part of 1903, the iron and steel trade has had a period of prosperity which it is not straining the point to say has never been equalled. Early in this period there were some doubts as to the genuineness of the movement, but soon all doubts were dispelled. At no time in 1905 was there serious question as to the future, and in 1906 there was hesitancy only for a brief spell, during the second quarter, when some southern iron producers saw fit to sell iron into the future at as low as $13, Birmingham, and a few northern steel producers made some concessions on certain finished steel products. This did not, however, constitute a depression, even of the mildest nature.

The situation now is radically different. For two months all iron and steel markets have been very quiet. The contrast with the corresponding period of last year is most marked. In 1906 a large buying movement in steel products began in June and was continued through the hot months. In July there was a heavy buying movement in foundry pig iron, advancing prices, while in August steel-making iron took up the swing, resulting in the sale in the Pittsburg district alone of more than 200,000 tons of Bessemer during the month. So strong was this midsummer movement that later in the year nearly all finished steel products were advanced in price.

Years ago, the iron and steel market was always dull in the summer, but in late years the rule has been broken. The iron business has largely absolved itself from the influence of season, consumption and demand being more steady throughout the year. Thus a midsummer dullness attracts much more notice than in times past.

All interests are eagerly seeking for light in this period of uncertainty. First an effort has been made to ascertain the cause of the dullness. The immediate cause is clearly that buyers have either stopped buying, or are buying less freely, but why they are buying less is not so easily discerned. One reason, of course, is the natural inclination to exercise caution when it is observed that a danger has been encountered, even though it has not resulted in harm. In the spring, consumers of pig iron bought freely for long periods ahead at high prices, thinking that prices were going to reach still higher levels. Now they see that they acted upon a false alarm and while they have not lost any considerable amount of money, since the market decline has not carried prices to below the average level of the spring purchases, they see that they ran a great risk. Buyers of finished steel products in their turn placed orders and specifications far ahead, anticipating a decided shortage. They, too, see that it was not really necessary to buy so far ahead and they also are now disposed to wait.

A cause commonly given for the almost complete cessation of railroad buying is the so-called hostility to railroads evinced by the national and state governments. This sentiment has doubtless been fostered very carefully by the railroads themselves and has probably been given entirely too much weight. Doubtless, if other conditions were entirely favorable, this would not act as a deterrent.

The tightness of money is the cause most generally assigned for the lack of buying, but that is begging the question. There is more money than there was a year ago, or two years ago, and the increase has been as great as has been the natural growth of business requiring money for its transaction. Anyhow, the needs of business can be subserved, if proper adjustments are made, by any volume of money, large or small. The trouble is that the world has been assuming it had more money than it really had, and is only now awakening. The heavy production of gold has been observed, and it has unthinkingly been assumed that the available supply of money has been correspondingly increased. As the pinch came, a closer scrutiny has been given, developing the fact that the world's available supply of money has increased very much less than the statistics of gold production had been taken to vouchsafe. Without going into detailed figures, it can be noted that careful investigation shows that no more than half the increase in gold production can be traced into an increased money supply.

This investigation could have been made before. That it was not made shows that the world has been indulging in some unwarranted speculation such as has always been the real cause of a depression.

As the supply of money increases, commodity values have a right to advance in proportion, allowing, however, a portion of the increase for the natural increase in the volume of business, but seeing that the increase in the supply of money is less than was assumed, it appears that commodity values have undergone a greater increase than economic conditions would permit. They must, then, undergo some decline to re-establish a proper basis.

The iron and steel trade has had no part in this mistake. Through conditions of its own making, it has prevented undue advances and has maintained a level of values which is strikingly moderate compared with past boom periods. It must, however, suffer for a time with other industries. It should be the earli-

est to emerge from the period of readjustment.

In some quarters there has been a disposition to attribute the lessened demand for iron and steel products to the large increases in productive capacity which are being made at this time. Naturally, if capacity is being increased at a time when no increase is necessary, lower prices should ensue, but this new erection has not been undertaken blindly. The idea was to serve the future, rather than the immediate present. It is the destiny of the United States Steel Corporation to turn its vast ore resources into cash, and to do so as rapidly as conditions may permit. With large annual earnings, and no means for their profitable investment except in plant, it is natural that it should build plants. They may not be needed immediately upon their completion, but it is better for them to lie idle for a while than for demand to overtake supply and a long wait to ensue before plants can be built. The depression of 1893-8 could have been attributed to excess capacity, but when it ended, capacity was insufficient, and a most unhealthy boom resulted. In 1903-4 there was an excess of capacity, for the time, due in part to the erection of some new blast furnaces which were not blown in for months after their completion, but when demand revived, the equipment was ready and an unhealthy boom was avoided. Had there not been such heavy new erection of 1903-4, although at the time it seemed uncalled for, the present period of prosperity would not have lasted so long. The present new erection may be a trifle ahead of the actual needs of the case, but the market is in strong hands and the period can be tided over.

DISTANCE IN THE PIG IRON INDUSTRY.

The recent arrival at New York of a sizable cargo of Chinese pig iron has attracted considerable attention as emphasizing the remarkable distances frequently traversed by even the most bulky of the materials entering into the iron industry. This iron, it is understood, commonly finds its foreign market in Germany, but is not a complete stranger along our Atlantic seaboard, as a larger cargo was distributed in the New York district some months ago. Under present conditions, of course, it can never become the basis of any regular import movement. The Chinese iron industry is by no means extensive and, in addition to meeting the uncertainties of delivery, its output must be carried half way round the globe before it can compete, with a tariff handicap of $4.00 a ton, for a purchaser on a par with American irons. It can be expected, however, to appear in moderate lots whenever the range of prices here becomes sufficiently high to render it attractive as a ballast shipment or as a return cargo for freighters engaged in the Philippine or other far-eastern trade.

From a less distant producing country, Great Britain, there is a regular import movement whenever domestic conditions approach those which have prevailed through most of the past year. Dependable statistics give the total imports of pig iron during the fiscal year ending with June last as 564,846 tons. Practically all of this was foundry iron and, for the most part, it came from British furnaces. This particular movement is now over, having played its important part in averting the much dreaded runaway prices in the American market. This Britsh iron, roughly speaking, made a sea voyage of 3,000 miles and, it is interesting to note, was largely produced in turn from ores mined on the continent.

Iron ore, in point of compactness and value several times as bulky as pig iron, is also a factor of importance in our import trade. During the same fiscal year mentioned above, the import movement was considerably in excess of 1,000,000 tons, but the larger part of this tonnage was from Cuban mines which supply two important eastern interests with a considerable percentage of their requirements. This tonnage is certain to show a heavy increase in the immediate future, owing to the discovery on the northeastern coast of Cuba of Bessemer deposits estimated to contain in excess of 500,000,000 tons of workable ores and the closing of contracts whereby at least 1,000,000 tons must be mined annually.

The landing of these Cuban ores at smelting points involves an average sea journey of about 1,000 miles, which, in view of the cheapness of ocean shipping, presents a less difficult problem than the delivery of ore from the Superior ranges to many interior furnaces. From the head of the great lakes, where the bulk of the ore is mined, to the extreme eastern point of Lake Erie, the maximum water shipment, the distance is close to 1,000 miles, but to the cost of this must be added, in the case of the numerous inland furnaces, the cost of rehandling from freighter to car and the considerable item of railway haul. With relatively few exceptions, the Ohio river marks the southern limit of the use of Superior ores, but western Pennsylvania furnaces are all dependent upon them and occasionally they enter the burden of plants in eastern Pennsylvania and New Jersey, in which case the transportation is a matter of perhaps 1,500 to 1,800 miles.

Instances of long shipments could be added almost without number. In an experimental way, iron ore of a high content is being brought from the northern shore of the Black sea to eastern smelting points, more than 6,000 miles. The delivery of iron from the Birmingham district to New England consumers involves a water shipment of close to 700 miles, after the iron is transported to seaboard. The natural tendency, as illustrated by the building of Gary, is to locate the plant favorably as regards both materials and market, but there are now and doubtless will continue to be instances of successful operation where at least one of the links in the chain of iron or steel making is of remarkable lngth.

Allis-Chalmers Orders.—In a statement made to a representative of THE IRON TRADE REVIEW, W. H. Whiteside, president of the Allis-Chalmers Co., Milwaukee, said that this concern now has orders on its books aggregating $15,400,000, which insures a full year's work ahead for all the company's manufacturing departments. These orders have been taken at exceptionally good prices and will show substantial profits. Furthermore, all of the seven plants of the company, located respectively at Milwaukee, Chicago, Cincinnati and Scranton, are operating at their utmost capacity. The largest orders on the company's books are from the United States Steel Corporation.

CAR PLANT BURNED

And Steel Plant Narrowly Escapes—New Steel Castings Foundry Near Seattle.

(Special Correspondence.)

Seattle, Wash., Aug. 15.—A disastrous fire broke out shortly after 1 a. m. Tuesday, Aug. 13, at the works of the Seattle Car Mfg. Co. at Youngstown near this city. The plant is a complete ruin; the loss is estimated between $150,000 and $200,000 including all of the machine tools, personal tools and effects of the employes and 1,000,000 feet of high grade lumber valued at $40,000. Six box cars and five cabooses which were practically ready for delivery were also destroyed. The cause of the fire is unknown. Means for fighting it successfully were not at hand. The $200,000 plant of the Seattle Steel Co. situated immediately adjacent to the car works, was saved only after a hard fight. Fortunately the car company has the construction work on its new plant at Renton well under way. This plant will now be rushed to completion with all possible speed.

An explosion which blew off the bell and hopper of the blast furnace of the Irondale Furnace Co. at Irondale near Port Townsend, Wash., occurred at 6 a. m. Sunday, Aug. 11. The plant which had been started for the first time the preceding Friday, had operated up to that time with entire success, producing No. 1 charcoal pig from what Manager Price declares to be the easiest smelting ore in the world. The explosion was caused by a slip generating a lot of pulverized charcoal which burned with great rapidity; at the same time, through a misunderstanding of signals, the bell was closed and the resulting pressure within the furnace blew off the bell and hopper. No one was hurt. The furnace will be in operation again this week and no further trouble is anticipated.

An open-hearth steel castings foundry is expected to begin running at Earlington near Seattle by Jan. 1. This will be the second steel foundry west of the Rocky mountains. The firm is incorporated for $200,000 and will be known as the Cascade Steel Foundry Co.; M. D. Leehey, president; J. F. McElroy, vice president; T. F. Ryan, treasurer; A. W. Henry, secretary and general manager. The company owns 20 acres at Earlington with excellent railroad facilities; the plant will have a daily capacity of 30 tons.

An independent system of 12 and 16-inch salt water mains is being planned for fire protection for the business section of Seattle. The new system is to cost $200,000.

The Washington Chemical Fuel Co. announces that it will erect in the near future a factory costing $175,000 for the purpose of manufacturing fuel by chemical process. It is proposed to produce 500 tons of the new fuel daily. Dr. G. W. Herben, president and treasurer of the concern, says that he has experimented with the fuel for six years and that it will be a perfect substitute for coal. He claims his fuel has greater heat energy than good soft coal, can be sold for half the price and is more easily handled. With soft coal $8.50 a ton in midsummer, Seattle people hope that he can make good his claims.

It is announced that the construction of the new $1,125,000 dry dock and other contemplated improvements at the navy yard, Puget Sound, will commence immediately; this denies a former report from Washington to the effect that all bids had been rejected and that the work would be indefinitely postponed.

GERMANY'S IRON OUTPUT.

The German Association of Iron and Steel Producers has issued the statistics as to the output of pig iron for June, thus completing the record for the half year, says the *Iron and Coal Trades Review*. In June the production amounted to 1,044,336 tons, as compared with 1,094,318 tons in the previous month of May and 1,021,815 tons in June, 1906. The figures for the corresponding six months in the past two years are as follows:

	Tons, 1907.	Tons, 1906.
Foundry pig	1,095,225	1,050,878
Bessemer pig	235,788	238,492
Basic pig	4,128,573	3,953,539
Ferro and spiegel	501,687	454,407
Forge pig	394,680	419,810
Total	6,355,953	6,117,126

The table indicates an increase of 238,827 tons in the first half of the present year as compared with the corresponding half of 1906, whereas the latter showed an advance of 1,018,538 tons over the first six months of 1905.

Improves Furnace.—The Jefferson Iron Co., Jefferson, Tex., manufacturer of the "Jefferson" brand of iron, announces that it has repaired and improved its furnace, changing it from a 50 to a 100-ton stack. The furnace was formerly operated with charcoal, but coke will be used in the future. The company will be prepared to make prices and accept orders for delivery by Sept. 1.

SHEET METAL WORKERS

Adopt Trade Resolutions at Cleveland Convention.—Pushing Tin Plate.

The third annual convention of the National Association of Master Sheet Workers of the United States, held at the Hollenden hotel, Cleveland, August 14, 15 and 16, was attended by several hundred delegates and business of considerable importance was transacted at the session. Trade resolutions adopted by the board of directors Feb. 20, 1907, were introduced for ratification and were approved by the convention. These provide that the members of the association, when possible, should confine their purchases of sheet metal supplies to manufacturers and jobbers who do not compete with their business. The resolutions also declare that the association request the manufacturers and dealers in sheet metal supplies to discontinue the practice of selling goods to builders or so-called sheet metal contractors who are under the direct jurisdiction of corporations or owners of large estates or buildings or their representatives and who cannot be said to be in the sheet metal business in any sense of the term.

The joint committee on tin plate from the association and manufacturers reported that it had been actively engaged during the year in successfully carrying out a comprehensive advertising campaign to present the advantages of tin plate roofing among contractors, architects, etc. As a result more contracts for this class of roofing are being placed and in the tabulation of the different roofings now being used it was reported that the percentage of tin plate roofing shows a steady advance. Various papers on topics of interest to sheet metal workers were presented at the different sessions, and it was the sense of the convention that the one on "The Eextent of Open-Shop Movement" by Paul L. Biersach, of Milwaukee, be printed for distribution among the association's members. The pleasure features of the convention included an automobile ride to Cleveland's beauty spots Thursday afternoon at 2 o'clock and a banquet at the Hollenden hotel Thursday evening at 7:30 o'clock.

A Correction.—In the description of the merchant mill of the International Harvester Co. published in THE IRON TRADE REVIEW of Aug. 15, the first line of page 265 credits the mill with an output of 400 tons on one turn This should read 4,000.

TO BAR BOYCOTT.

Action is Begun by Manufacturers' Head Against Union Leaders—Labor News.

A legal action of especial significance to the respective interests of capital and labor was instituted in the supreme court of the District of Columbia, Aug. 19, by James W. Van Cleave, president of the National Association of Manufacturers, who sought to enjoin Samuel Gompers, John Mitchell and other officers of the American Federation of Labor, with several of its subsidiary organizations, from using the boycott and so-called "unfair list." The suit was begun by Mr. Van Cleave in the name of the Buck Stove & Range Co., of St. Louis, whose products are alleged to have been declared unfair by the labor union. The importance of the suit lies in its being a test case which has for its purpose the permanent restraint of the labor union from using these tactics against employers.

After first alleging an unlawful conspiracy to injure its business, the plaintiff asks in its bill that the defendants be enjoined on a number of special counts. These points are as follows: From in any manner carrying on a conspiracy to restrain and destroy the plaintiff's business; from agreeing or combining to interfere in any way with the business; from boycotting or attempting to boycott or threatening to boycott the plaintiff or its business; from printing, publishing or distributing any literature which contains any reference to the plaintiff as being on the "unfair list"; from publishing or circulating any statement that the plaintiff's factory had been boycotted; from threatening or intimidating the plaintiff's customers; from giving any orders or directions that would interfere with the plaintiff's business, and from carrying on the alleged conspiracy to restrain and prevent the plaintiff in conducting its proper business in any other states or territories of the country.

Machinists Are Enjoined.

The Thomas Carlin Sons Co., Allegheny, Pa., has secured an injunction against Organizer Arthur E. Ireland and others of the International Association of Machinists, enjoining the machinists from interfering with the operation of the company's plant. The strike now on arose over the discharge of two union machinists whom the company would not reinstate upon demand of the organizer, and he called out the remaining 45 machinists. Thos. M. McBride, secretary-treasurer of the company, refused to treat with other than his employes, considering the organizer an outsider.

Breaking a Strike.

From Fitchburg, Mass., where an extensive strike of machinists was called a short time ago, comes the report that excellent success is being encountered in equipping and operating the affected works with independent workmen. The four-story building of the Fitchburg Athletic Club has been engaged for the accommodation of the imported workmen, who are enjoying the luxuries of shower baths, bowling alleys, etc. Strenuous intimidation methods have been employed, but with little success, and it is evident that the struck plants will shortly be operating again to full capacity.

Labor Notes.

The Sharon Steel Hoop Co., Sharon, Pa., has signed the new Amalgamated Association scale, effective until July 1, 1908.

The strike declared by the molders against the Bass Foundry & Machine Co., Fort Wayne, Ind., April 25, 1907, has been called off by the union, says the National Founders' Association. One hundred and thirty molders and coremakers were originally affected by the trouble, but after the strike had proceeded only a few weeks a number of the men returned to work.

The financial statement of the International Association of Machinists from Dec. 1, 1906, to May 31, 1907, indicates that the organization expended $166,128.67, of which amount $73,219.50 was paid for strike benefits, $22,500 for death benefits and the remainder for salaries, official expenses, organization work, etc. Receipts for the period were $247,346.72, an increase of $49,369.56 over the previous half year. Cash, bonds, stock and bank certificates on hand May 31, 1907, amounted to $181,029.93.

Because an ironworker employed by Cramp & Co., Philadelphia, on a building operation was discharged by reason of incompetency recently, the Allied Building Trades Council, of that city, at the instance of the Structural Iron Workers' Union, ordered a strike on the building, and also on the Forrest theater, which is being erected by the Cramp company. In addition to the structural iron workers the plumbers', electricians', steam fitters', sheet metal workers', elevator constructors' and wire lathers' unions quit work as a sympathetic movement.

SUMMER DULLNESS

Prevails Among New York Machine Tool Dealers.—Manufacturers Busy.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St.,
New York, Aug. 20.

The local machine tool market is practically without developments, other than that an increasing number of dealers are apparently finding conditions less active than earlier in the summer. The first two weeks in August, it seems, were unusually quiet, though in the past few days some improvement has been noted With the holiday season at its height, this is not surprising and can be expected to continue at least until after Labor Day. It is counterbalanced in part by the action of a good many important manufacturing establishments in closing down at this time for a brief holiday and repair season. Among manufacturers there is only the most general optimism. The rush of orders continues and deliveries are not improving to any extent.

The trade is awaiting with interest the beginning of purchases for the large plant which the General Electric Co. is to establish at Erie, Pa., as was announced in the last issue of THE IRON TRADE REVIEW. So far as can be learned, no buying has yet been done, but the size of the proposed works insures heavy purchases in which many lines will share.

A change has just been made in the machinery arcade at 107 Liberty street, New York. The Buffalo Gasoline Motor Co., Buffalo, N. Y., has been represented for about four years at this address by H. L. Edge, as agent. He now retires and the business will be continued by the Motor Boat Supply Co., which will maintain its present office at 10 West Sixtieth street as a branch. M. L. Bridgman, president of the company, will have his headquarters here, but the secretary, A. C. D. Louks, will be in active charge.

William H. Dechant, of Reading, Pa., has been awarded the contract for building a large electric generating plant at Manayunk, Pa., for supplying current to surrounding mills. The plant will be situated on the Schuylkill canal and will cost about $100,000.

Estimates have been invited by Ballinger & Perrot, architects of Philadelphia, for an engine room and boiler house adjacent to the plant now building at Langhorne for C. J. Matthews & Co.

OBITUARIES.

William A. Paxton, president of the Paxton & Vierling Iron Works, Omaha, Neb., manufacturer of structural and ornamental iron and steel, died recently at his home in that city from a sudden attack of heart disease, culminating from a state of feeble health which had continued for the past two years. Mr. Paxton was a native of Kentucky, having been born of Scotch ancestry in that state 70 years ago. After obtaining an early education, at the age of 12 he moved with his father to Middleton, Mo. Leaving home the next year, he entered the employ of M. J. Ragan, who was later awarded by the government the contract for the building of the bridges on the old military road between Omaha and Fort Kearney. Mr. Paxton was placed in charge of this work and established his headquarters at Omaha in 1857 from which he directed the completion of the contract. Later he engaged in the freighting business between Omaha and Denver, interrupting this pursuit for a time to join the party constructing the Western Union Telegraph Co.'s line between the east and the coast. He then did contracting work for the Union Pacific railroad, and in 1869 in company with others incorporated the Omaha & Northwestern railroad, which is now a part of the Northwestern system. In 1883 he formed a company and established the Union stock yards, becoming known as the "father of the South Omaha stock yards." The inception of the Paxton & Vierling Iron Works followed in 1886, and this plant by steady growth has come to be one of Omaha's leading industries. Mr. Paxton's varied interests made him a prominent factor in the development of the city of Omaha and he was regarded as one of its leading citizens. In a political way he had been honored by the election to office in both the senate and house of Nebraska state legislature. In the death of Mr. Paxton the Paxton & Vierling works meets with a peculiarily unfortunate coincidence, having also lost by death last December its vice president, Robert Vierling, of Chicago. Mr. Vierling and Mr. Paxton were associated in the founding of the Paxton & Vierling works.

Benjamin Sparrow, of Cambridge, Mass., inventor of the two blade speed propeller, and other important devices, died Aug. 10.

John H. McClure, formerly president of the Mosseley Iron Roofing & Bridge Co., died Aug. 13 of tuberculosis at his home in Brooklyn, aged 59. He was the son of John Sparks McClure, a well-known banker of New York.

William J. Miller Jr. died Aug. 14 at Denver, Colo., death coming from a long illness following a stroke of paralysis. Mr. Miller was formerly a member of the Miller Forge Co., of Pittsburg, of which his father was the head. Ill health caused him to take up his residence in Denver a number of years ago where he became identified with the banking interests of that city.

David E. Evans, president of the Baltimore Electric Co., Baltimore, and one of the best known men of affairs of that city, died Aug. 15 at St. Joseph's hospital, Baltimore, following an operation, from peritonitis. He had only been ill several days, the first symptoms of his complaint appearing while he was at work in his office three days before his death. Mr. Evans was born in Cardiff, Wales, 55 years ago, and devoted his early years to serving as a machinist and then as a mechanical engineer at the coal and iron manufacturing town of Pontypridd. After spending several years as a steamship engineer, Mr. Evans returned to Wales, taking up mining and engineering in the employ of the Clymer Steam Coal Co. He then became chief engineer for Wellyllm & Cubit, manufacturers of locomotives and mining engines, later coming to the United States, where he located at Cleveland. Mr. Evans there entered the employ of the Brush Electric Co., taking charge of the erecting and testing of the electric light machines then being installed for the first time. In 1882 he was sent to the Brush Co. at Baltimore as superintendent, and shortly afterwards had the duty of chief engineer added to his work. In 1889 he became superintendent of the Baxter Electric Motor Co., one of the pioneers in the manufacture of railway and stationary motors. About this time he organized the contracting and consulting engineering firm of David E. Evans & Co., and later became president of the Maryland Telephone Co., Baltimore, and when the Maryland Telephone & Telegraph and the Baltimore Electric Power companies were consolidated recently, he was placed at the head of the new company, styled the Baltimore Electric Co.

PERSONALS.

F. E. Vivian Bond, of Vivian Bond & Co., is in Europe.

George H. Schuler, treasurer of the Southern Steel Co., was in New York during the past week.

Foster Hillix, an instructor at Purdue University, Lafayette, Ind., has sold a recent invention for breaking bars of soft steel, upon which he held a patent, to the Western Steel & Mfg. Co. of Springfield, O.

George Westighouse, president of the Westinghouse companies, has sailed for Europe. Before leaving Mr. Westinghouse expressed the opinion that any business recession would not be of long duration.

W. P. Snyder and C. S. Dyer, of the Shenango Furnace Co. were members of the large party that came to the head of the lakes on the maiden trip of the new steamer Wilpen of the Snyder Steamship Co. They visited the Mesabi range before returning.

J. M. Bush has been appointed to succeed H. F. Ellard, resigned, to the superintendency of the Ashland mine of the Cleveland-Cliffs Iron Co. Mr. Bush has been in charge of the Crosby mine on the Mesabi range and previous to that was located at the Ashland.

C. J. Connell has been appointed assistant secretary in charge of the accounting department of the Universal Portland Cement Co., Chicago and Pittsburg, and Frederick Blanchard has been made credit manager in charge of credits and collections.

Wilbur J. Watson, who recently resigned his position of bridge engineer with the Osborne Engineering Co., consulting engineer, Cleveland, has opened offices in the Citizens' building, Cleveland, and will devote himself to the design, inspection and construction of bridges, buildings and special structures.

Marcel Foucard, chief engineer of the Filer & Stowell Co., Milwaukee, has resigned to accept a high position with the Bolinders Engineering Works of Stockholm, Sweden. The company manufactures marine and stationary engines, water tube boilers, gas and gasoline engines and saw mills, and is considering the manufacture of steam turbines. This is the third time that a chief engineer of the Filer & Stowell plant has been called to fill a leading position abroad. John Weber, who left some four years ago, is also with the Bolinders company. Mr. Foucard was born in London and attended technical schools in France and Sweden. He was for a time in the employ of the General Electric Co.

COST VS. VALUE IN LUBRICATION.

Lubrication cost correctly computed, is not limited to the price of the lubricants used, but includes the value of the power lost by not having the least possible friction and all the cost of that margin or difference between the existing and the least possible friction. The cost of friction is measured in fuel, wear of parts, decreased output, repairs, delays of operation caused by breakdowns due to friction, and finally in depreciation.

Some friction there must be. The most any lubricant can do is to substitute for the very high friction between metals, its relatively very low internal friction. It is not accurate, therefore, to say that the cost of lubrication is the cost of the lubricant plus the cost of the friction accompanying its use, as the statement has been worded by an eminent authority. There remains, however, a very large and tangible additional cost to be apportioned among the items mentioned. In the aggregate these items may amount to many times the price of all the lubricants. So much is this the case that the best and cheapest lubricant may be said to be the one which produces the least possible friction, regardless of its market price.

To this must be added the special cost of damage caused by or incident to lubrication in a number of cases. Most familiar among these is the heavy item of oil stains on fabrics in textile mills. An extra item of cost of very common occurrence, yet rarely taken into account is the damage done to belting by oil drips and the increased slippage of belts due to the same cause. Similar is the item of injury to rubber caused by splashing oil, as on the tires of automobiles, on hose used around machinery and on rubber packing and gaskets.

Considerations of this kind emphasize the importance of selecting lubricants with a view to other qualities than merely their market price. As the expense for oil is in every case but trifling as compared to the expense of fuel, a loss of power of a few per cent due to increased friction, offsets several times all economy attained by using cheap grades of oil or grease. It is surprising how quickly the frictional losses run up in case of poor lubrication. In a series of tests, Goodman found that a journal revolving at 122 feet per minute in a bearing 4 inches long, with a bearing surface having two inches width of chord, gave a frictional resistance of 2.89 pounds under oil bath lubrication, which increased to 4.47 pounds with saturated pad, and to 7.97 pounds with oily pad lubrication. In the bath form the under side of the journal dipped in a bath of the lubricant, picking up and throwing against the brass a thick film of oil. Pad lubrication was obtained by pressing against the journal a woolen or felt pad soaked with the lubricant.

From this experiment it is clear that with oily pad lubrication, which is still very extensively used, the frictional resistance is 2.4 times greater than the least attainable. Consider that this means an unnecessary load 2.4 times that which ought to be carried; *i. e.*, an absolute waste of so much coal and energy. This will bring home most forcibly the idea of the difference between cost and value.

A bearing may be cool and still use up an undue amount of power in friction. Sometimes a free supply of lubricant carries off the heat generated by friction as fast as it is produced, so that the brasses are cool to the touch, yet wasting valuable energy. This is especially the case with greases. They have a normal viscosity which causes them to consume much power, while not seeming to do so according to the generally accepted indication of low temperature. It is by no means correct to say that a bearing cannot run well and economically at temperatures far above blood heat. A. N. Mattice, of the Allis-Chalmers Co., recently published a statement that more bearings were running properly at above one hundred and fifty degrees Fahrenheit than below that temperature, and that temperatures up to one hundred and eighty degrees Fahrenheit were by no means unusual, without undue consumption of power in friction.

Greases found their first advocates from the fact that they do not drip or run through the bearings as many oils do with a very material waste and spattering of oil. While not intrinsically cheaper than oil, they appeal to consumers because less weight or volume is used per unit of time than with oils. Yet while all this is achieved, it is often at the cost of power and economy. A notable example is that of car journals, lubricated with grease blocks almost as hard as cakes of soap, which are held up against the underside of the journal by a metal cage. Bearings thus lubricated are commonly seen at way stations, fairly sizzling with heat. It is true that they save in lubricants, but at the expense of power.

There is a class of lubricants known as non-fluid oils, which does combine all the economical features of greases while acting as true oils when once on the bearings. These aids to engineering are wholly free from acids and gummy residues, so that they wholly obviate the difficulty of keeping supply pipes clear in central distribution lubrication, so much in vogue now, which produces such deleterious effects in the structural parts. Oils of this nature are especially to be recommended where bearings are working at great pressure and velocity, as the viscosity varies in different grades and under different conditions in the same grades, so that the unguent acts as a self adapter to special local conditions.

STANDARD SPECIFICATIONS FOR STAYBOLT IRON.

At the meeting of the American Society for Testing Material at Atlantic City last May, the committee on standard specifications for staybolts recommended the following specifications for staybolt iron for final adoption:

Process of Manufacture.—All iron staybolts must be hammered or rolled from a bloom or pile having a minimum cross-sectional area of 45 square inches, and about 18 inches long.

The pile must be made up of a central core composed of bars of from ½ inch to one inch square and be covered on all four sides with an envelope ⅝ inch thick. This pile must be rolled to a billet, allowed to cool, again heated, and then rolled into bars of the required dimensions.

Physical Tests. (*a*) Tensile Strength—not less than 48,000 pounds per square inch.

(*b*) Elongation—not less than 28 per cent in eight inches.

(*c*) Reduction of area—not less than 45 per cent.

(*d*) Double bending test—close in both directions without flaw.

(*e*) Threading—permitting the cutting of a clear, sharp thread.

(*f*) Vibration—shall stand a minimum of 6,000 revolutions when subjected to the following vibratory tests:

A threaded specimen, fixed at one end, has the other end moved in a circular path while stressed with a tensile load of 4,000 pounds. The circle described shall have a radius of 3-32 inch at a point eight inches from the end of the specimen.

Inspection. (*a*) The iron must be smoothly rolled and free from slivers, depressions, seams, crop ends and evidences of being burnt.

(*b*) It must be truly round within 0.01 of an inch and must not be more than 0.005 above, or more than 0.01 of an inch below specified sizes.

Selection of Samples for Test.—The bars will be sorted into lots of 100 bars each and two bars will be selected at random from each pile, failure of either of these bars to meet any of the above specifications will be cause for rejection of the lot which the tests represent.

Birch & Birch, Crawsfordville, Ind., have let the contract for the erection of a new brick foundry, 40 x 75 feet.

COMPRESSION OF STEEL BY WIRE DRAWING DURING SOLIDIFICATION IN THE INGOT MOLD

Among the many remedies proposed for the breakage of steel rails, Major E. L. Zalinski, U. S. A., retired, has suggested the compression of the ingot by wire-drawing during its solidification. Major Zalinski contributed to the *Journal of the United States Artillery* a monograph on this subject, describing the Harmet process as practiced at Saint Etienne in France. We give herewith a copious abstract of the above article.

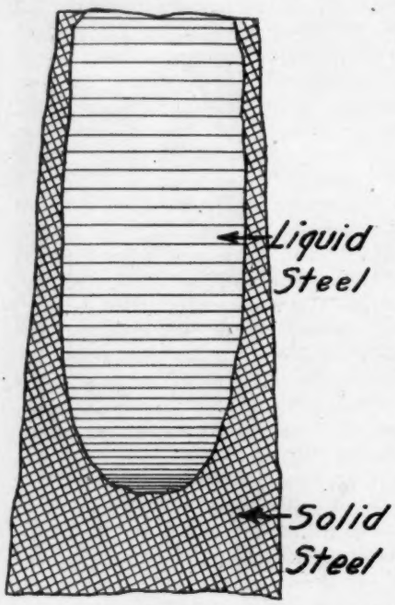


FIG. 1.—METHOD OF FORMATION OF PIPE IN INGOT.

The object of compression of steel during the process of solidification is to prevent as far as possible the formation of those defects that are found in ingots allowed to cool undisturbed. Dealing with the steel within the ingot mold, this, though it may be of the finest quality, while in the liquid state, can completely change its character during the passage into the ingot mold, unless particular attention is bestowed upon the conditions and circumstances which accompany the solidification with the object of combating the defects which tend to develop there. The cooling process exposes the metal to the injurious effect of three forces—contraction, crystallization, and liquation, all of which change the qualities which are essential to commercial sale. In order the better to define the period of time which it is desired to investigate, it may be assumed that the metal passes from the liquid to the solid and cold state in two phases, corresponding, respectively, to the liquid state in the ingot mold, from 2,000 degrees Fahr. to the moment of stripping the ingot at 700 degrees Fahr., and the period spent in cooling from 700 degrees Fahr. to atmospheric temperature.

During the first of these phases, the steel poured in the mold may either be left to shrink freely or be subjected to compression by the Whitworth system, or subjected to compression by wire-drawing by the Harmet system. It should be noted that the liquid steel immediately on pouring into the mold forms a solid crust, due to contact with the cold walls, which increase in thickness, rapidly forming a shell containing liquid metal and of the shape shown in Fig. 1. The almost instantaneous shrinkage of this shell causes the separation of the ingot from immediate contact with the mold. A moment or two after casting, it settles firmly on the bottom, no longer supporting itself against the walls of the mold. At this moment, the process of compression should intervene, and it is essential that this should be done to preserve the steel.

Contraction.

The form of the solid shell, as regards its external dimensions, is determined from the time of the formation of the outer crust. The greater part of the contraction has already taken place, but there still remains the internal liquid mass, of which the volume is greatly modified by shrinkage. During cooling, the liquid becomes plastic, and adheres progressively to the first shell, leaving in the interior a hollow corresponding to the volume of the shrinkage.

A cold ingot when divided through its vertical axis, shows a cavity, Fig. 2, due to the flow of metal, which, as long as it is liquid, continues to descend by its own weight to fill the hollows left in the lower part, due to shrinkage. In addition, a hollow space is formed in the center just after solidification, on account of the failure of the supply of liquid metal to fill the new cavities. This defect in the metal extends along the axis throughout the whole upper half of the ingot. Microscopic examinations of the lower half show porosities existing in the center and tiny cracks permeating the entire solid mass. When the lower part of the ingot is solidified throughout its whole thickness, and as soon as the descent of the upper layers of liquid metal is interrupted, the shrinkage, proceeding as the cooling continues, sets up within the metal injurious stresses which cause much mischief. At the end of the first phase of cooling, viz., at the moment of stripping the ingot, at 700 degrees Fahr., an ingot left to cool undisturbed will exhibit minute cracks throughout its length, which will extend in the same manner throughout the entire mass of metal. The defect is aggravated by the further shrinkage which continues in cooling from 700 degrees Fahr., if this takes place within the ingot mold. In most cases, however, ingots, when they reach this temperature, are worked in the rolling mills. Thus contraction of steel left undisturbed in the mold produces two serious defects, namely, pipe cavities or porosities about the center, while the metal is still liquid or in a plastic condition, and stresses, fissures and porosities throughout the whole mass, which to the naked eye appears compact and perfectly sound.

Crystallization.

Steel in solidifying crystallizes in the form of an interlacing dendritic

FIG. 2.—TYPICAL PIPE IN INGOT.

structure upon the internal surface of the pipe, in regular needles on the external surface of the ingot, or in polyhedric grains within the central mass. These crystals have little co-

hesion between themselves, and when stresses, due to contraction within the metal are set up, they meet with but low resistance and cracking easily occurs. The polyhedric crystals often form groups divided by cleavage planes. These constitute the weak points, which require subsequently to be strengthened by forging process in order to retain the necessary toughness in the finished product. Crystallization is promoted by any step which delays the solidification, as lining the upper part of the mold with refractory material, and also by the contraction of the ingot, which left to itself, separates from the cold wall of the mold.

Liquation.

Metalloids entering into the composition of the steel have a tendency to separate from the iron by liquation. The carbon is the most mobile, being attracted in turn towards the more fluid parts finally concentrating where solidification last takes place, viz., the head of the ingot when left to cool undisturbed, and particularly, if solidification is delayed by the use of a refractory-lined mold. All that is gained by the attempt to prevent the formation of a pipe by placing on top of the ingot a cover of refractory material is the raising of the pipe or the concentrating of it at a somewhat higher level. The ingot remains porous along its center, but the cavities are not so large.

This method of covering the ingot, by which the hardening of the metal in the upper part is delayed, is attended with a development of a coarse crystallization and tends to promote liquation by attracting to the lower part when kept liquid for a longer time the carbon which rises in proportion as solidification proceeds in the lower part, and thus has more time in which to travel upwards. It thus results that a steel, although perfect in the liquid state, is permeated with defects when, after undisturbed cooling in the ingot mold, it is taken out at a temperature of 700 degrees Fahr. to be worked in the mills. The upper portion is affected with pipe, the whole mass is seamed with cracks, torn by the internal stresses and cleft by crystallization, while the composition is irregular, due to liquation.

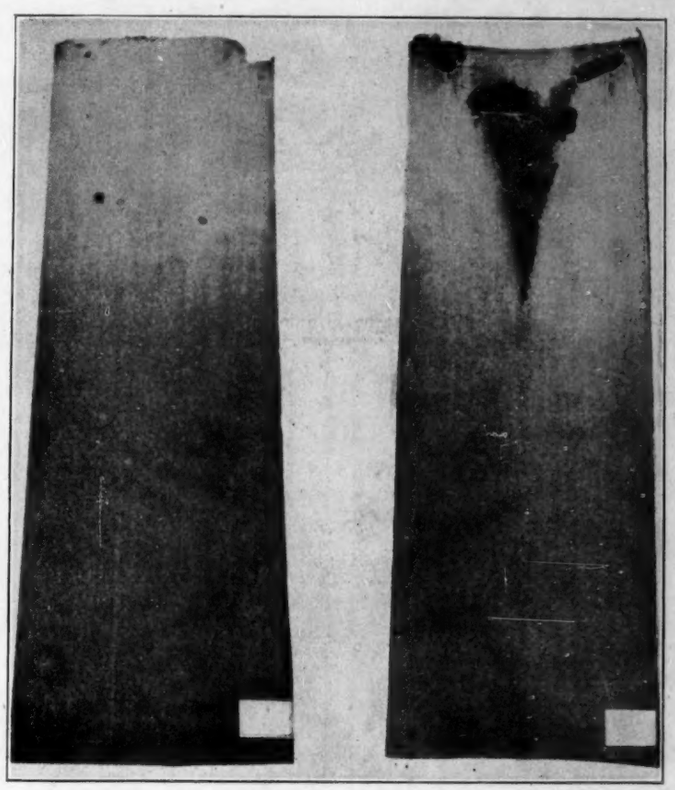
Mechanical treatment must be relied on to correct as far as possible the defects, which were allowed to occur during solidification. The upper pipe end must be cropped, the fissures rewelded, the stresses relieved and the crystallization broken up and reduced to a fine state. Notwithstanding the application of means to effect these improvements, the liquation remains unaltered and many defects continue in existence only to be discovered later in the tests on specimens made after finishing the material.

Instead of remedying defects permitted to form within a metal perfect when leaving the furnace, it is preferable to prevent or palliate them during solidification. This is effected by compression by wire drawing, which is now about to be discussed.

Compression by Wire Drawing.

The main object of compression by wire drawing is not so much to remedy the defects of the metal as to forestall their development. The elimination of minor defects is left to the subsequent mechanical operations, such as rolling or forging. All defects originating within the ingot mold are due to the contraction which produces pipe, the porosities about the center line, and the cracks and fissures throughout the whole mass. They are also to be attributed to the retardation in cooling, which promotes the formation of large crystals with cleavages and the liquation of carbon. The contraction or shrinkage during cooling follows a natural law which must pursue its course. This is injurious on account of the fact that the outer shell of the ingot is permanently fixed, and the subsequent shrinkage of the central mass cannot, therefore, take place without leaving hollows in the form of pipe, porosities or cracks. If the external shell is forced inwards upon the central mass and is compelled to follow the shrinking movement, or even to close in at a rate somewhat quicker than that at which the volume diminishes, the formation of cavities and internal faults will be avoided. This result is attained by compression by wire drawing.

In order to combat the effect of shrinkage, the compression by wire-drawing must be applied to the whole surface of the ingot, restricting or diminishing its volume by closing inwards upon the central mass as shrinking proceeds. This entails the performance of work which constitutes the underlying principle of the process and the value of which is proportionate to the total contraction of the mass upon which it acts. The amount of contraction per unit of volume or of weight is constant for one kind of steel of definite charac-



a—Compressed Ingot. *b*—Uncompressed Ingot.

Fig. 3.—Longitudinal Sections by Plane Through Axis of Compressed and Uncompressed Ingots.

ter, but varies with different kinds of steel. The work necessary to counteract the effect of this contraction per unit of weight will consequently be a constant for each kind of steel. Therefore, the work necessary to compress by wire drawing any kind of ingot will be proportionate to the weight of the ingot.

Liquation and formation of coarse crystals with cleavages are due to regradual advancement of the ingot under pressure from below, and in a liquid body, which contracts or undergoes reduction of volume in passing to the solid state, pressure hastens the transition. This results in the shortening of the time, and, at the same time, a diminution in the crystallization and the liquation. The molecular movement, which, owing to the pressure takes place throughout

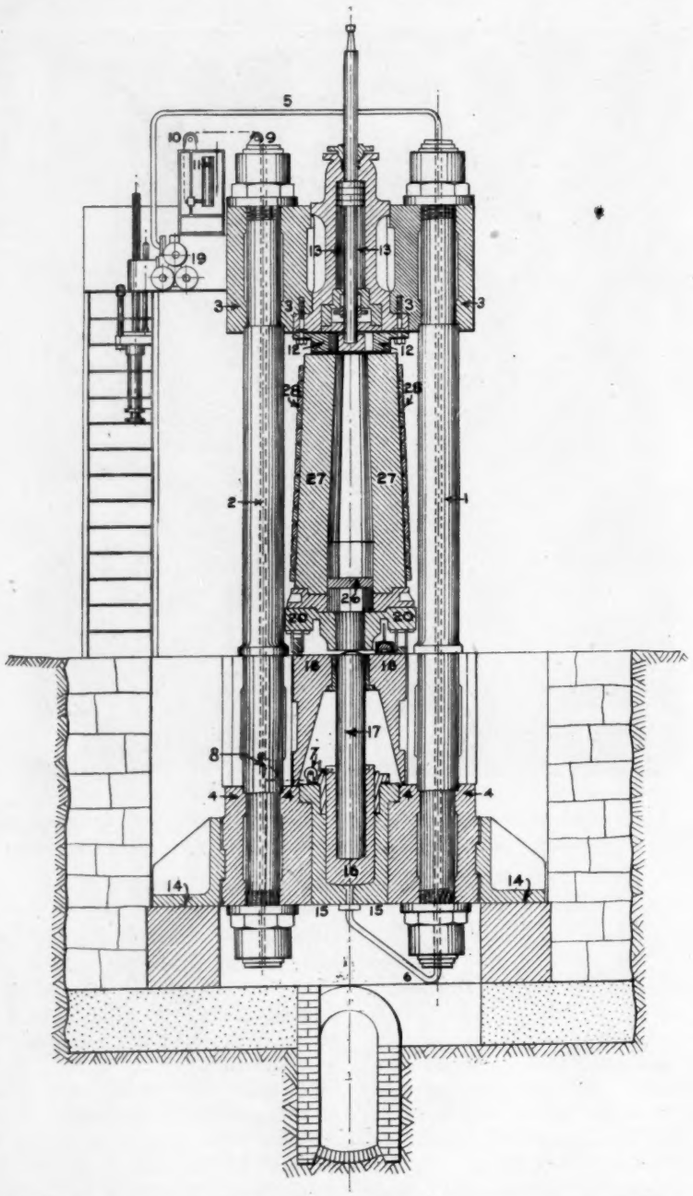


FIG. 4.—1,200-TON PRESS FOR WIRE DRAWING INGOTS INSTALLED AT SAINT ETIENNE.

tardation in cooling. It is impossible to overcome these defects completely, as instantaneous solidification is out of the question. Compression by wire drawing will sensibly diminish them, since the ingot mold consists not only of a mass of metal which rapidly absorbs heat, but it is kept in contact with the metal to be cooled by the the mass, also tends to effect a diminution in the crystallization and liquation.

The injurious influence of shrinkage begins to make itself felt immediately on pouring the metal into the mold. If a vertical section be made from the metal a vessel of the form shown in Fig. 1 is obtained composed of a solid but extremely thin shell already separated from contact with the mold, owing to lateral contraction and filled with a heavy liquid, the weight of which tends to burst the shell, producing cracks through which it finds a vent. It is at this instant that pressure should be applied to the vessel from below for the purpose of supporting the weak shell by thrusting it against the cold walls of the conical mold. The shell is then forced upwards in the cone and closes in on the central mass in proportion as the hollows tend to form within, due to shrinkage. By hastening the solidification, the coarse crystallization with cleavages is counteracted, and the tendency of the carbon to accumulate in the upper part of the ingot is lessened. The pressure upon the base or the rate of advancement within the mold is so controlled as to keep the shell constantly full without overflowing. The speed is regulated according to the rate of contraction, exceeding the latter slightly, in order to maintain every portion of the ingot under a state of continuous pressure, but tensile stress never occurs in any portion.

This compression by wire drawing being applied to the metal after casting and placing the whole mass under pressure without causing any tensile stress entirely prevents the formation of internal cracks from the first moment it is brought into action; it also preserves the absolute solidity of the ingot without pipe or cavities about the center, produces a fine crystallization without cleavage planes, greatly reduces liquation and generally improves the physical properties, owing to the effect being similar to that of forging. On taking a vertical section through the axis, the compressed ingot presents the shape and appearance shown in Fig. 3-a, whereas without compression the same metal would present the appearance shown in Fig. 3-b.

The Installation at Saint Etienne.

The following is a brief description of one of the 1,200-ton presses for five to 10-ton ingots installed by the steel works at Saint Etienne. Referring to Fig. 4, two upper and lower cross pieces 3 and 4 are separated by two forged steel tie-bolts, the latter being hollow. Through the central opening in one tie-bolt are led two cords, their lower ends being attached to the ram of the press. One is lead over pulley 10 to an indicator within sight of the operator actuating a pointer which traces the curve indicating the speed of ascent of the piston; the other cord runs to the

accumulator and governs the regulator valve, stopping the stress automatically, if the operator is inattentive or passes the desired point. A plate 12 is attached to the cross piece 3 and is vertically adjustable. This serves as an abutment against which the top of the mold rests during compression. The stripping cylinder 13, containing a double-acting piston, is also carried on the upper cross piece. The lower piece 4 carries two supports 14, a forged steel cylinder 15, the piston and ram 16 and 17, both of which are of forged steel;

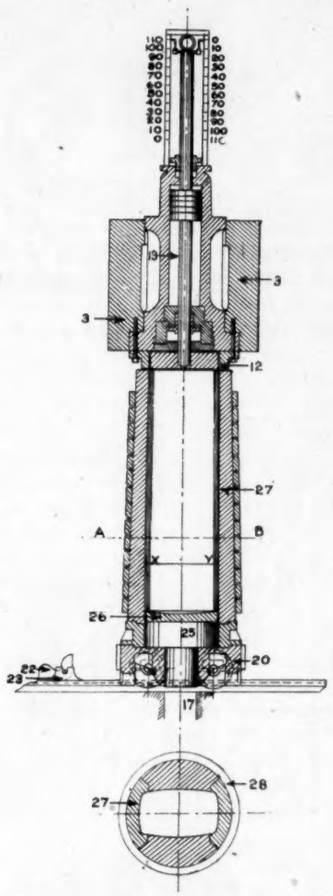


FIG. 5.—CAR AND INGOT MOLD FOR 1,200-TON PRESS.

the intermediate piece 18 of cast iron serves as a guide to the ram. The operator is stationed on a platform close to the starting valve 19 of the indicator 11. The quantity of water required is small and may be supplied by an accumulator of small size. Compression is effected between the ram 17 and the plate of abutment 12. The steel undergoing compression is within the mold 27, which is brought to the press on a car 20, a track being provided for this purpose.

The car 20, shown in Fig. 5, is of cast iron. It is moved by a pawl carried on a rack 23, which engages with the ribs cast underneath the body of the car. It contains a movable plunger 25, the under side of which is of special form and between it and the circumferential portion of the upper portion of the ram is allowed a play of 0.03 inch. The plunger is shaped so that any tendency to deviate from its axis and to tilt to one side is corrected by the ram. A cast iron disk 26 protects the upper surface of the ram against the action of the steel during pouring.

The ingot mold comprises a cast iron casing 27, the interior near the base being cylindrical in form. Beginning at the line XY, Fig. 5, the form becomes conical with a taper of 1 in 30. A series of hoops 28 of cast steel encircle the mold and hold the split sections of it firmly together.

When the car with the mold containing the liquid steel is brought beneath the press, the ingot is compressed, precautions meantime being taken to prevent the ingot from flowing over and preventing the formation of pipe, and also for avoiding the excessive spurting of liquid metal within the mold, which may be caused by too great a speed in performing the operation. The contraction of the ingot must be followed up and the rate of this should be even slightly exceeded, in order to compress the core of the ingot. Regarding the upward speed or advance, which is most suitable, this must vary according to the rate of contraction—be judged by first determining the rate of advancement of the piston in terms of the time. The steps to be followed in making this determination it is not necessary to detail here. Suffice to say that each type of mold has its distinct curve, which, when once traced on the cylinder of the indicator, permits a regulating of the upward speed of the press. The indicator consists of a cylindrical drum revolving on a vertical axis by means of clockwork. It carries a roll of paper, on which is previously traced the curve of the upward speed of the piston. A pencil holder sliding vertically, moved by the cord attached to one end of the piston, as heretofore described, is caused to traverse vertically the same distance as the piston. For perfect compression the curve traced by the pencil in its vertical movement, while the cylinder is revolved by clockwork, should appear superimposed upon the normal curve determined by experiment. Instead of taking an approximate curve for the investigation and following it while controlling the press by hand, it was found to be more simple to remove the stripping cylinder and substitute a mirror at 45 degrees, which reflects the surface of the ingot within the mold during the whole time it is under compression. By watching the metal it is possible to control the press with ease and to so

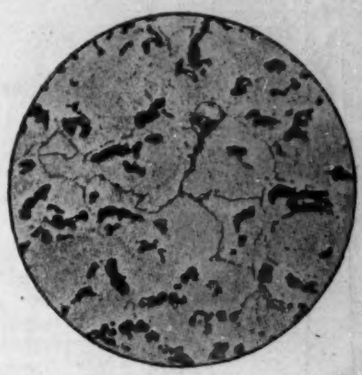


FIG. 6.—UNCOMPRESSED METAL (FISSURED,) SMALL INGOT, MAGNIFICATION 80.

regulate its speed as to keep the ingot full of metal with just a tendency to overflow.

The dimensions and power of the press and the accessory controlling apparatus vary with the weight of the ingots to be compressed. A certain definite relationship should exist between the presses, the molds, and the ingots, and, therefore, a complete commercial installation comprises a series of special installations designed and constructed according to the same type, but varying in di-

FIG. 7.—COMPRESSED METAL, SMALL INGOT, MAGNIFICATION 80.

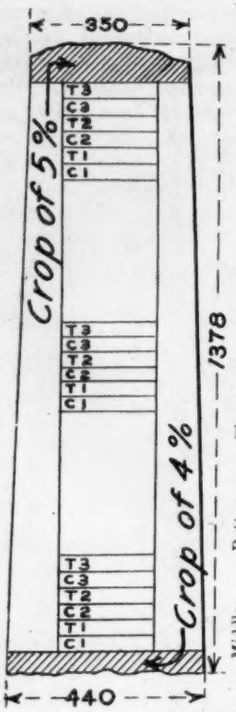
mensions and power according to the weight of the ingots to be produced.

Results.

Two kinds of results are to be considered—commercial or mechanical results, and scientific or physical results. The first commercial result to be noted is the economy in metal or the better utilization of the metal, as shown in Fig. 3, which is an illustra-

Table I—Tests on Rough Ingots.

Compressed Ingot, waste being 5 per cent. Uncompressed Ingot, waste being 28 per cent.



TENSILE TESTS.

	Marks.	Elastic Limit per mm².	Load producing rupture. kg. per mm².	Elongation. per cent.	Fractures.
Bottom	T 1	71.6	73.5	5.0	BK
	T 2	72.9	80.2	7.0	BK
	T 3	69.6	82.3	11.0	B
Middle	T 1	71.6	84.3	7.0	BK
	T 2	71.2	81.7	6.0	K
	T 3	71.2	83.1	7.2	BF
Top	T 1	70.5	70.5	3.0	BD
	T 2	75.1	82.4	7.0	B
	T 3	74.9	82.3	10.5	BF

IMPACT TESTS.—*Bars* = 20×20 *mm. Weight of Drop-hammer* = 18 *kilogs.*

Bottom	C 1	Deflected 33 mm. at 20th blow. Broken in press, angle 92°.
	C 2	Broken at 8th blow. Angle 148°.
	C 3	Deflected 31 mm. at 20th blow. Broken in press, angle 90°.
Middle	C 1	Broken at 20th blow. Angle 113°.
	C 2	Deflected 32 mm. at 20th blow. Broken in press, angle 98°.
	C 3	Broken at 13th blow. Angle 135°.
Top	C 1	Broken at 13th blow. Angle 150°.
	C 2	" 12th " " 142°.
	C 3	" 18th " " 102°.

TENSILE TESTS.

	Marks.	Elastic Limit per mm².	Load producing rupture. kg. per mm².	Elongation. per cent.	Fractures.
Bottom	T 1	72.9	81.6	8.0	D
	T 2	66.6	70.5	5.0	KD
	T 3	68.5	72.5	6.5	KD
Middle	T 1	69.9	72.5	4.5	KD
	T 2	61.5	61.5	2.0	KD
	T 3	62.6	62.6	2.3	KD
Top	T 1	Defective specimens. Results, Nil.			
	T 2	" " "			
	T 3				

IMPACT TESTS.—*Bars* = 20×20 *mm. Weight of Drop-hammer* = 18 *kilogs.*

Bottom	C 1	Deflected 32 mm. at 20th blow. Broken in press, angle 79°.
	C 2	Broken at 3rd blow. Angle 160°.
	C 3	Broken at 5th blow. Angle 152°.
Middle	C 1	Broken at 8th blow. Angle 141°.
	C 2	" 6th " 148°.
	C 3	" 5th " 154°.
Top	C 1	Defective bar. Results, Nil.
	C 2	" "
	C 3	" "

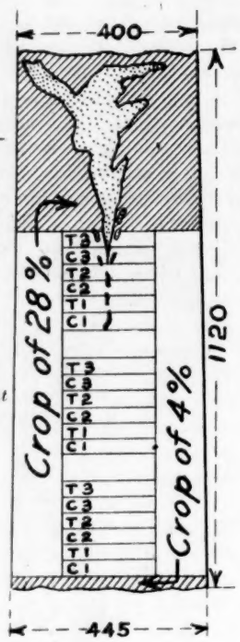
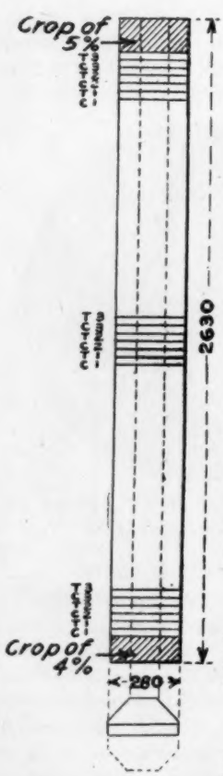


Table II—Tests on Forged Ingots, Subjected to Two Workings.

Compressed Ingot, waste being 5 per cent. Uncompressed Ingot, waste being 28 per cent.



TENSILE TESTS.

	Marks.	Elastic Limit per mm².	Load producing rupture. kg. per mm².	Elongation. per cent.	Fractures.
Bottom	T 1	62.2	74.2	14.3	B
	T 2	58.1	72.2	13.0	B
	T 3	60.8	74.9	15.0	B
Middle	T 1	58.0	72.5	13.2	B
	T 2	58.1	73.5	9.0	FG
	T 3	43.5	64.2	12.0	FG
Top	T 1	Defective specimen, results, nil.			
	T 2	42.8	63.3	9.5	B
	T 3	47.4	69.9	13.5	BG

IMPACT TESTS.—*Bars* = 20×20 *mm. Weight of Drop-hammer* = 18 *kilogs.*

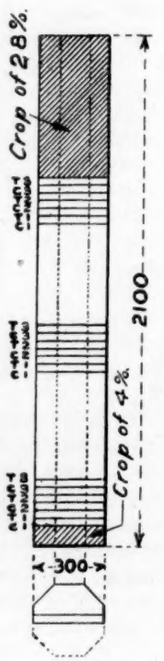
Bottom	C 1	Deflection = 27 mm. at 20th blow. Broken in press, angle 67°.
	C 2	Deflection = 25 mm. at 20th blow. Broken in press, angle 48°.
	C 3	Deflection = 26 mm. at 20th blow. Broken in press, angle 52°.
Middle	C 1	Deflection = 27 mm. at 20th blow. Broken in press, angle 60°.
	C 2	Deflection = 26 mm. at 20th blow. Broken in press, angle 27°.
	C 3	Deflection = 25 mm. at 20th blow. Broken in press, angle 63°.
Top	C 1	Deflection = 26 mm. at 20th blow. Broken in press, angle 72°.
	C 2	Deflection = 27 mm. at 20th blow. Broken in press, angle 54°.
	C 3	Deflection = 27 mm. at 20th blow. Broken in press when doubled close.

TENSILE TESTS.

	Marks.	Elastic Limit per mm².	Load producing rupture. kg. per mm².	Elongation. per cent.	Fractures.
Bottom	T 1	Defective specimen, results, Nil.			
	T 2	63.5	76.9	13.2	B
	T 3	60.2	73.5	14.5	B
Middle	T 1	58.0	72.5	13.2	FD
	T 2	.....	59.3	16.0	BD
	T 3	59.5	72.9	11.0	BD
Top	T 1	Defective specimen. Results, Nil.			
	T 2	" " "			
	T 3				

IMPACT TESTS.—*Bars* = 20×20 *mm. Weight of Drop-hammer* = 18 *kilogs.*

Bottom	C 1	Deflection = 30 mm. at 20th blow. Doubled in press without cracking.
	C 2	Deflection = 31 mm. at 20th blow. Doubled in press with slight crack'g.
	C 3	Deflection = 29 mm. at 20th blow. Broken in press, angle 39°.
Middle	C 1	Deflection = 27 mm. at 20th blow. Broken in press, angle 69°.
	C 2	Deflection = 30 mm. at 20th blow. Broken in press, angle 33°.
	C 3	Deflection = 31 mm. at 20th blow. Broken in press, angle 37°.
Top	C 1	Fracture at 1st blow. Angle 180°.
	C 2	Fracture at 1st blow. Angle 180°.
	C 3	Fracture at 1st blow. Angle 180°.



tion of the compressed and uncompressed ingot. With uncompressed steel, it is necessary to cut 30 to 40 per cent of the length from the upper part of the ingot, in order to reach the sound portion near the

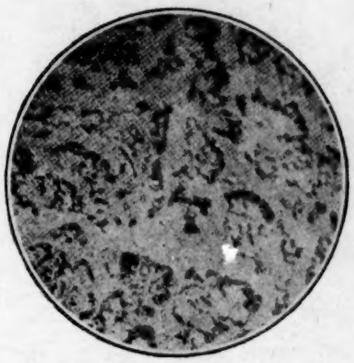


FIG. 8.—COMPRESSED METAL. (3)[1]

base. The advisability of moving a still greater waste piece is revealed by the aid of a lens or microscope. Steel compressed by wire drawing is satisfactory if but 4 per cent is cut from the upper part of the ingot. As a result, in an existing works, of which the various buildings and mechanical appliances are well arranged, compression by wire drawing will increase the productive capacity by 25 per cent, and in new works, the adoption of compression would enable the same rate of finished product to be turned out but with a reduction in the mechanical equipment, furnaces and plant of 25 per cent, as compared with an ordinary works of the same capacity of output.

Compression by wire drawing not only eliminates the effects due to contraction, but effects a forging of the metal, lessening the subsequent labor to obtain the same results.

Table I gives results of tests on

FIG. 11.—COMPRESSED METAL. (6)[1]

sections from rough ingots, in which the core part is included. An examination of these results shows (a),

[1]The figures (1), (2), (3), etc., refer to reference numbers on Figs. 20 and 21.

that in the metal of a compressed ingot adjacent to the waste piece equal to 5 per cent of the total metal, the mean result of the three tensile tests was:

Limit of elasticity, 104,490 pounds per square inch.

Stress producing rupture, 111,456 pounds per square inch.

Elongation, per cent, 6.83 per cent.

Three bars subjected to the impact test withstood an average of 14 blows, each from a drop hammer weighing 39 pounds falling from a height of seven feet.

(b) That in the case of an uncompressed ingot, after cutting off 28 per cent of the whole metal, all the tensile and impact tests failed to give any result at all.

Again on comparing the results in table II of tests on steel which had undergone two workings,[2] and also those in table III, of tests on steel subjected to four workings,[2] it will be observed that the superiority of the compressed steel is nearly as marked as in the former case.

Tests on Forged Steels.

A single forging operation, or one

FIG. 9.—COMPRESSED METAL. (4)[1]

FIG. 12.—COMPRESSED METAL. (7)[1]

working, is sufficient for forged steel, since the effect of compression is

[2]The expression "two workings" means a forging operation, which reduces the cross section of the ingot by one-half; "four workings," one which reduces the section by three-fourths.

analogous to a forging operation upon the whole mass. The metal, therefore, retains much fewer internal stresses. These are retained by ordinary steel in its soundest portions. Comparing the results of impact tests given in

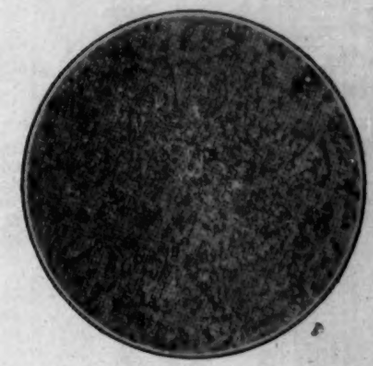


FIG. 10.—COMPRESSED METAL. (5)[1]

table II, carried out on steels which had undergone two workings with those given in table III, on steels subjected to four workings, it will be observed in the portions taken from the upper part where the waste had been cut off, that in the case of the compressed ingot with 5 per cent of waste with two workings all the bars withstood 20 blows and with four workings all the bars also withstood 20 blows. Two workings are, therefore, as effective as four, so far as satisfying the conditions of French specifications is concerned. In the case of ingots cast in refractory-lined molds and with a waste of 28 per cent the results of impact with two workings showed that fracture occurred with the fifth, the second and the sixth blow, respectively, but with four workings all the bars were good. The effect of two workings is, therefore, inferior to that of four in the case of uncompressed ingots cast in

FIG. 13.—COMPRESSED METAL. (8)[1]

refractory-lined molds. For ingots cast in plain molds, the waste being 28 per cent, the effect of two forgings is also inferior to that of four.

Ingots of about 260 pounds were

Table III—Tests on Forged Ingots, Subjected to Four Workings.

Compressed Ingot, waste being 5 per cent. Uncompressed Ingot, waste being 28 per cent.

TENSILE TESTS.

Marks.		Elastic Limit per mm².	Load producing rupture. kg. per mm².	Elongation. per cent.	Fractures.
Bottom	T 1	68.5	81.4	10.8	B
	T 2	66.2	80.2	11.0	B
	T 3	66.2	80.2	11.2	B
Middle	T 1	68.9	83.0	12.0	B
	T 2	63.5	78.9	11.0	B
	T 3	68.3	80.2	9.0	B
Top	T 1	65.9	84.4	9.0	BD
	T 2	69.9	83.7	9.5	B
	T 3	69.2	81.7	5.5	B

IMPACT TESTS.—*Bars* = 20×20 *mm. Weight of Drop-hammer* = 18 *kilogs.*

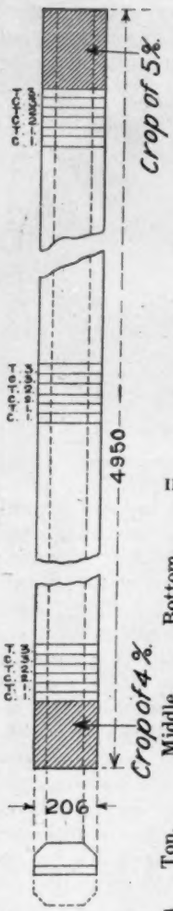
Bottom.	C 1	Deflection = 30 mm. at 20th blow. Broken in press, angle 70°.
	C 2	Deflection = 32 mm. at 20th blow. Broken in press, angle 91°.
	C 3	Deflection = 36 mm. at 20th blow. Broken in press, angle 35°.
Middle.	C 1	Deflection = 32 mm. at 20th blow. Broken in press, angle 48°.
	C 2	Deflection = 31 mm. at 20th blow. Broken in press, angle 49°.
	C 3	Deflection = 35 mm. at 20th blow. Broken in press, angle 85°.
Top.	C 1	Deflection = 31 mm. at 20th blow. Broken in press, angle 70°.
	C 2	Deflection = 34 mm. at 20th blow. Broken in press, angle 91°.
	C 3	Deflection = 32 mm. at 20th blow. Broken in press, angle 68°.

TENSILE TESTS.

Marks.		Elastic Limit per mm².	Load producing rupture. kg. per mm².	Elongation. per cent.	Fractures.
Bottom	T 1	52.9	70.9	11.0	F
	T 2	66.2	76.9	7.0	B
	T 3	40.1	62.2	10.5	G
Middle	T 1	46.8	64.2	17,0	B
	T 2	39.4	64.8	17.0	B
	T 3	Defective specimen, results, Nil.			
Top	T 1	"	"	"	
	T 2	"	"	"	
	T 3	"	"	"	

IMPACT TESTS.—*Bars* = 20×20 *mm. Weight of Drop-hammer* = 18 *kilogs.*

Bottom	C 1	Deflection = 31 mm. at 20th blow. Broken in press, angle 80°.
	C 2	Deflection = 40 mm. at 20th blow. Broken in press, angle 0°,
	C 3	Deflection = 34 mm. at 20th blow. Broken in press, angle 44°.
Middle	C 1	Deflection = 37 mm. at 20th blow. Broken in press, angle 0°.
	C 2	Deflection = 38 mm. at 20th blow. Doubled close in press, no cracks.
	C 3	Deflection = 40 mm. at 20th blow. Broken in press, angle 69°.
Top	C 1	Deflection = 34 mm. at 20th blow. Broken in press, angle 43°.
	C 2	Deflection = 34 mm. at 20th blow. Broken in press, angle 78°.
	C 3	Deflection = 36 mm. at 20th blow. Broken in press, angle 50°.



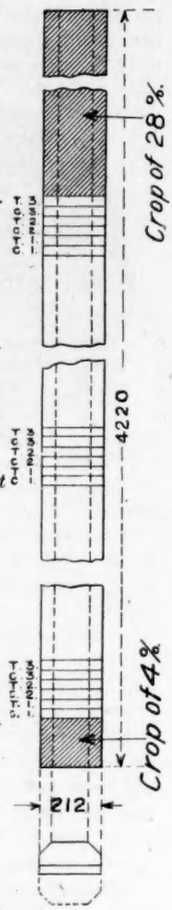


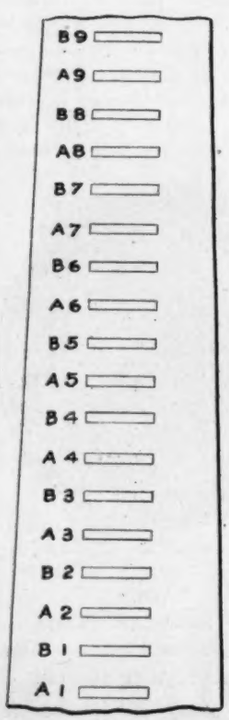
Table IV—Tests on Rough Ingots Before and After Tempering.

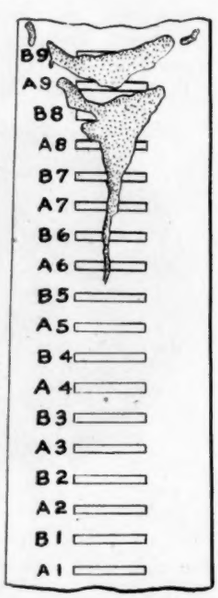
Compressed Ingot.

Marks.	Elastic Limit per mm².	Load producing rupture. kg. per mm².	Elongation. per cent.
Specimens in natural state.			
A 1	23.1	42.7	11.5
A 2	16.7	35.4	10.8
A 3	16.7	36.1	11.0
A 4	16.7	35.4	11.5
A 5	17.0	37.3	11.0
A 6	19.7	38.8	8.2
A 7	17.4	37.4	6.0
A 8	19.7	38.2	7.8
A 9	21.1	38.7	5.0
Specimens heated to 1000°, quenched and annealed.			
B 1	29.7	43.5	20.0
B 2	29.0	42.1	12.3
B 3	30.1	43.5	13.5
B 4	28.4	42.8	15.0
B 5	30.1	44.8	12.5
B 6	30.7	44.1	13.5
B 7	30.4	45.5	9.5
B 8	31.7	46.8	11.0
B 9	31.0	44.1	12.0

Uncompressed Ingot.

Marks.	Elastic Limit per mm².	Load producing rupture. kg. per mm².	Elongation. per cent.
Specimens in natural state.			
A 1	18.7	39.4	14.0
A 2	16.3	27.8	4.3
A 3	17.3	24.0	4.2
A 4	16.7	26.7	5.0
A 5	16.7	17.0	2.0
A 6, A 7, A 8, A 9	Defective specimens, crossed by pipe.		
Specimens heated to 1000°, quenched and annealed.			
B 1	30.5	35.9	6.5
B 2	29.4	36.6	6.0
B 3	Results nil. Local defects		
B 4	21.7	21.7	0.0
B 5	Results nil. Local defects.		
B 6, B 7, B 8, B 9	Defective specimens, crossed by pipe.		





compressed during five, six, seven, eight, nine and ten minutes, respectively, and were left to contract freely. After five or six minutes, the metal was still liquid, or at least pasty

FIG. 14.—COMPRESSED METAL. (9)

about the center at the time the action of the press was interrupted. Subsequent contraction took place to the injury of the part not yet solidified, and it yielded to tension, leaving cavities which, however, diminish in size as the time more nearly approximates that necessary for solidification. At the end of eight minutes, solidification is complete, and this period corresponds for the ingot of 260 pounds to what has been referred to as the first phase after cooling. If the ingot were treated mechanically in the mills immediately, it would give a perfect metal. If, on the contrary, it is allowed to cool after these eight minutes of compression, the ingot remains solid, since the metal is no longer mobile. Cavities cannot be formed, but the metal may be cracked by the shrinkage subsequent to compression. The lowest limit for the compression of ingots of 260 pounds is, therefore, eight minutes, the compression leaving them free at the moment that solidification is complete and while the metal is still weak. At the end of nine minutes' compression no defect is apparent to the naked eye, notwithstanding the shrinkage which continues after compression. In order not to risk coming too near the limit, a compression of 10 minutes' duration should be allowed for ingots of 260 pounds with molds of low cooling power. Absolute soundness of metal would then be assurred, but even so, it would be preferable to work the ingot immediately on leaving the press. A compression of eight minutes, however, is sufficient, if the ingot while hot is stripped and sent to the rolling mills. For crucible steel the time necessary for compression is less than for open-hearth steel, since the pouring is much slower. The influence of compression by wire drawing on the cooling is noteworthy, as this takes place almost evenly from top to bottom, the head cooling as rapidly as the face, a condition which favors the chemical homogeneity of the metal.

FIG. 15.—UNCOMPRESSED METAL. (10)

Physical Homogeneity.

The compactness resulting from compression extends through the whole mass and gives a sound metal thoroughly homogeneous in the very center of the ingot. This is shown by fractures made on bars 4 x 4 inches taken from the central portion of two ingots, one compressed and the other uncompressed.

The compact metal free from defects in the core is undeniably the best for every kind of manufacture, since forging or rolling always has a tendency to strain the core of the metal, a tendency which is aggravated by the defects already existing. In all ingot steel cast freely without compression the core exhibits from top to bottom (apart from the pipe) a defective material full of porosities, due to contraction. Since the compression of steel by wire drawing obviates the defects which occur in the mold, forgings from compressed steel will offer more resistance than those from uncompressed metal under the same conditions of shape and stress.

FIG. 16.—UNCOMPRESSED METAL (FISSURED.) (11)

Diminution of the Liquation.

The more perfect homogeneity noticeable in compressed ingots has already been explained. Analyses given in table V show the comparative homogeneity of two ingots taken from the same charge for the purpose of investigation, which were, respectively, compressed and cast in a plain mold. These ingots were divided sectionally and the analyses show the composition of the metal at those points marked with a number.

The homogeneity is noticeably superior in the compressed steel, although sample 15 was taken at the extreme limit towards the upper end at a much higher point than in the case of the other one.

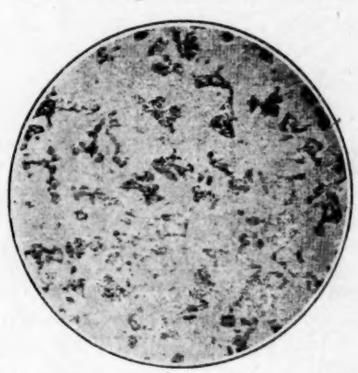


FIG. 17.—UNCOMPRESSED METAL. (12)

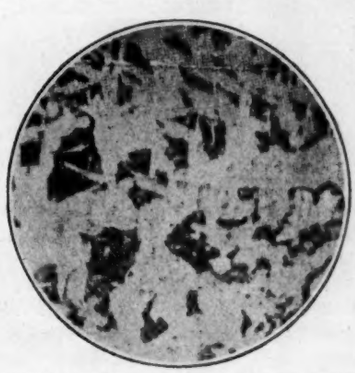


FIG. 18.—UNCOMPRESSED METAL. (13)

FIG. 19.—UNCOMPRESSED METAL (FISSURED.) (14)

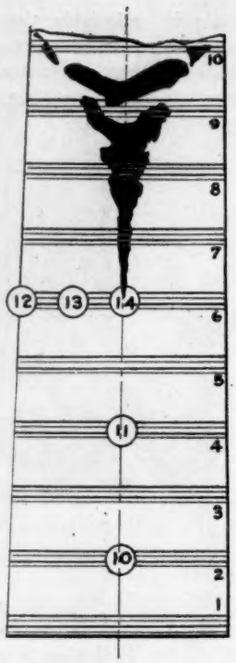


FIG. 20.—POSITION OF SPECIMENS IN INGOTS. FIGS. 8-19.

The improvement would be still more marked in the case of very heavy ingots of large cross section.

Improvement of the Metal as Regards Mechanical Tests.

In order to show the improvement in different conditions of the metal, the accompanying tables give comparative tests on rough ingots, on ingots that had received two workings and on ingots that had been given four workings, and then in the fourth table, comparative tests on the natural metal and metal that had been tempered and annealed. In each case the two ingots were of the same weight and of the same charge.

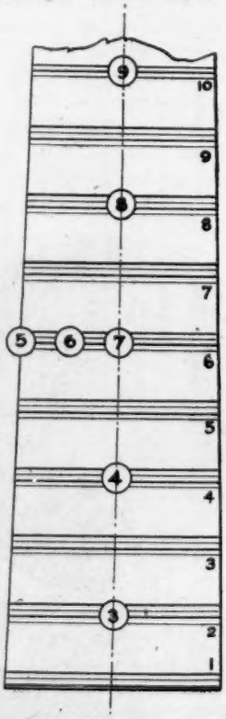


FIG. 21.—POSITION OF SPECIMENS IN INGOTS. FIGS. 8-19.

For the tests in the first three tables, a waste of 5 per cent was cut from the top of the compressed ingots and of 28 per cent from the uncompressed ingots. In each ingot a block containing the axis was cut out. The sketches accompanying the tables show the location of the test specimens and how they were taken. It is clearly seen that the compressed metal possesses qualities superior to those of the uncompressed metal, which can be noted in all conditions of the metal (tables II and III); even after four workings the difference in favor of the compressed metal is very great.

FIG. 22.—CARBON STEEL INGOT UNCOMPRESSED, LONGITUDINAL SECTION METAL OF LENGTH OF INGOT.

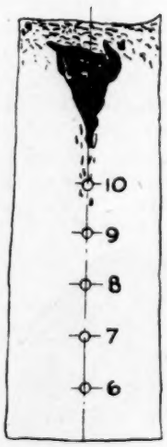
The qualities, due to compression, are brought out in a particularly striking manner in table IV by the action of tempering. In the compressed metal, this treatment, by increasing the homogeneity, increases the elastic limit, the tenacity, and especially the elongation. In the uncompressed metal, it develops defects, since it renders the specimens unfit for tests and diminishes the elongation. The fact that tempering accentuates the faults of the uncompressed metal, and, on the other hand, improves the compressed metal, leads to the conclusion that the latter contains no incipient fissures and no internal stresses that tempering releases by producing fractures and fissures. A study of the fractures in table I leads to the same conclusion.[8]

The compressed ingot presents to the eye a grain of a visibly fine structure and large cleavages no longer exist. The photomicrographs, Figs. 6 and 7, repre-

[8]The letters A, B, C, D, F, G, H, J, K, in the fracture column refer to a classification currently used in France to denote the various aspects presented by the fracture:
A—fibrous fracture exhibiting a surface entirely cupped.
B—fibrous fracture, on the surface of which the cupped part is incomplete.
C—horizontal fracture, fibrous center surrounded by ring of very fine crystals.
D—fibrous, not quite horizontal, with lines across somewhat akin to woody fiber in appearance.
F—smooth diagonal fibrous fracture, inclined at about 45 degrees to axis of test piece.
G—fairly smooth fibrous fracture, V-shaped, showing a bright line in the angle.
H—finely crystalline, bright, horizontal fracture, slight flaw on surface, contraction of area small.
J—very finely crystalline, dull, horizontal fracture, very little contraction of area.
K—fracture showing large bright crystals, horizontal, with scarcely any contraction at all.
A is considered a perfect fracture, and the others follow in the order of the letters, each succeeding one being worse than that preceding.

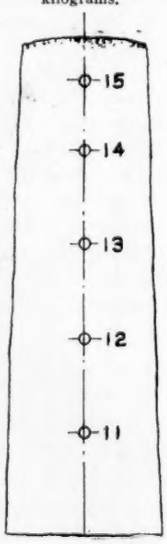
V.—Tests of Rough Ingots. (Analyses Taken Along the Center).

Steel cast in plain mold. Weight = 1210 kilograms.



	PER CENT
6	C = 0.40, S = 0.008, P = 0.023
7	C = 0.40, S = 0.007, P = 0.023
8	C = 0.41, S = 0.007, P = 0.024
9	C = 0.45, S = 0.010, P = 0.024
10	C = 0.45, S = 0.010, P = 0.025

Compressed Steel. Weight = 1340 kilograms.



	PER CENT
11	C = 0.40, S = 0.008, P = 0.023
12	C = 0.41, S = 0.008, P = 0.024
13	C = 0.42, S = 0.009, P = 0.023
14	C = 0.42, S = 0.009, P = 0.025
15	C = 0.41, S = 0.009, P = 0.023

sent the structure of two small ingots, the natural metal showing a fissue of considerable extent. Figs. 8 to 19 show the structure at a magnification of 80 of two ingots of the same charge and the sketches Figs. 20 and 21 indicate the position in the ingots from which the specimens were taken. In general, the constituents, ferrite and pearlite, show in their disposition a greater degree of homogeneity in the case of the compressed ingot. Moreover, a minute examination of the uncompressed ingot, Fig. 16, reveals a large band of ferrite traversed by a small crack of microscopic size, which in the further course of operations, would form an obstacle to

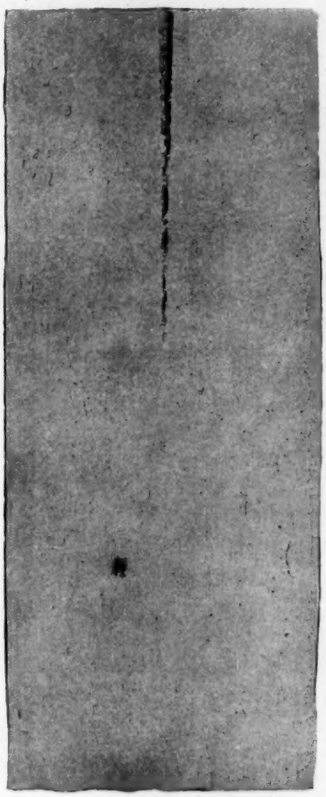


FIG. 23.—NICKEL STEEL INGOT UNCOMPRESSED, LONGITUDINAL SECTION MIDDLE OF LENGTH OF INGOT.

prevent the unity of the pearlite of either side of it, thus an artificial cleavage would occur at this point in the rolled or forged piece which would prove more or less troublesome, according to the direction of the stress to which the metal is subsequently subjected. In Fig. 19, showing the structure of the uncompressed ingot, a similar occurrence may be observed. These cracks constitute a starting point for rupture and the unexpected failure of steel in use is often due to them. In the photomicrographs of the uncompressed ingot, on the other hand, the dendritic structure, and above all the cracks and cleavages are absent.

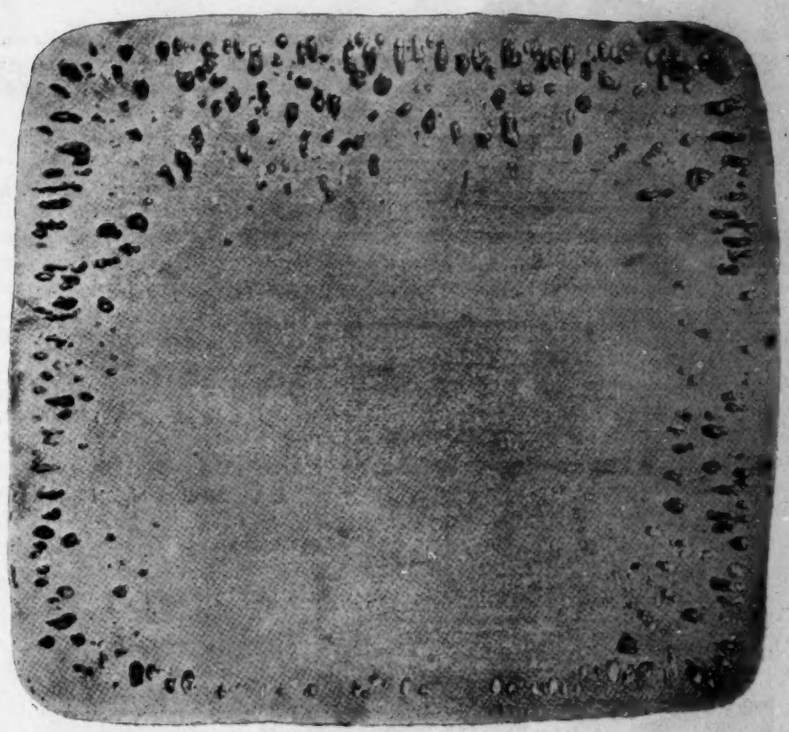


FIG. 24.—CARBON STEEL INGOT (UNCOMPRESSED) TEST SPECIMEN 16½ INCHES FROM BOTTOM.

The Harmet process, as described, is employed commercially on a large scale at the steel works at Saint Etienne and the results obtained are most satisfactory. The compressed metal has been used with success for armor plates, projectiles, crank shafts, etc. Figs. 22, 23, 24 and 25 are two steel ingots, one of carbon steel and one of nickel steel. These ingots were found full of small cavities resulting from continuous contraction of the metal when passing from the fluid to the solid state. There was also considerable piping on the interior of the ingots. These ingots were of steel used in the manufacture of gun forgings, and the use of compressed steel presents an economical advantage in that the large portion of the ingot is acceptable for gun, armor and forgings, admitting only of perfect metal. The French government now accepts the Harmet process of steel ingots with five per cent of wastage, instead of the 28 per cent required for the uncompressed steel ingots, and there is a further economy in that the Harmet steel with but two forgings gives as good results in impact tests as uncompressed steel gives in four forgings.

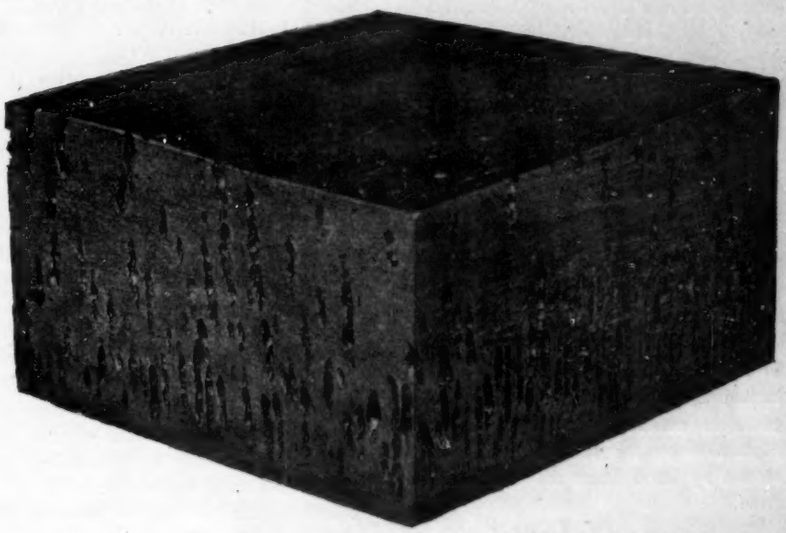


FIG. 25.—NICKEL STEEL INGOT (UNCOMPRESSED) TEST SPECIMEN; APPEARANCE AS TAKEN FROM INGOT.

A NEW OPEN SIDE SHAPER.

The accompanying illustration shows a new open side shaper built by the Cincinnati Shaper Co., Cincinnati. This is rated as the 15 x 60-inch machine. It is one of a line of open side shapers the smallest of which planes 15 inches in width. The tool is of the well known Richards type with improvements designed by the Cincinnati Shaper Co., and for certain classes of work can be used to better advantage than either a pillar shaper, a traverse shaper or a planer.

The machine is driven by a single screw working in a bronze nut without the intervention of any gears. This screw, which is made of 0.50 carbon steel, is 2⅛ inches diameter. The saddle of the machine has a long and wide bearing on the column. A narrow and deep guiding surface is provided on the saddle bearing to prevent binding, particularly, when the tool is at the outer end of the rail. A taper gib adjustable lengthwise by screws at each end is provided, affording uniform contact on both sides. The cross feed may be driven by power or hand. It is positive in its action and adjustable. The down feed is by hand.

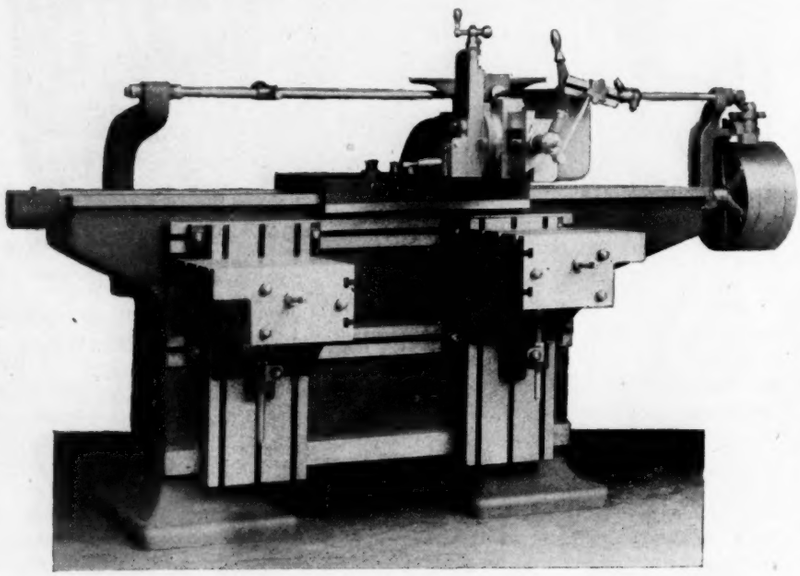
A new reversing mechanism has been designed for this machine, which depends upon the turning of the shifting rod, both for reversing the motion of the saddle and for the automatic cross feed to the head. This rod is automatically turned by cams on the saddle, which come in contact with dogs which are adjustable on the rod. It may also be turned by hand from the saddle, if desired.

The shifting rod is provided with ball bearings, as is the elevating screw to the table. Taper gibs on the cross rail and head provide a means for the taking up of wear. The head, which is graduated and swiveling has a down feed of 6½ inches. A micrometer collar reading to 0.001 inch is provided on it.

The tables are raised and lowered by crank handles, or they may be entirely removed and the work bolted on the aprons. If desired, however, both tables and aprons may be removed and the work bolted against the face of the machine. The machine is especially adapted keyseating of shafting, it being possible to handle any diameter.

The machine is well finished, all flat bearings being hand scraped to surface plates and all T-slots cut from the solid. Ample provision is made for oiling. The following table shows some of the principal dimensions of the machine:

Length of stroke	60	inches
Width planed	15	"
Maximum distance head to table	23¼	"
Width of table	15¾	"
Vertical adjustment of table	19	"
Down feed of tool slide	6½	"



15 x 60-INCH OPEN SIDE SHAPER.

COMMUTATOR TRUING DEVICE.

The accompanying illustration shows a handy commutator truing device placed on the market by the Patterson Tool & Supply Co., Dayton, O. This device is especially adapted to large direct-connected generators, from which it is impossible to remove the armature for the purpose of truing up the commutator. The present device is intended to be bolted to the sub-base of the generator and the commutator trued by revolving the armature slowly while the tool is fed in and across the face of the commutator.

As will be noticed from the illustration, the device comprises a base carrying a split sleeve, in which the column supporting the tool-rest is adjusted. Both cross and longitudinal feed are provided, being hand fed. The tool has a longitudinal feed of 15 inches and a cross feed of 5 inches.

PATTERSON COMMUTATOR TRUING DEVICE.

A vertical adjustment of 6 inches is possible and a ⅜x¾ inch tool is used. The device weighs 75 pounds.

THE "DIAMOND" IMPROVED TURRET HEAD.

The accompanying illustrations show the "Diamond" improved turret head recently brought out by the Diamond Power Specialty Co., 236 West Fort St., Detroit. This is a patented device designed for general use in any machine, in which either the work or the tool rotates, to fill the need usually supplied by a turret lathe in large shops. Used in a drill press it converts the machine into a multiple spindle press with all the advantages secured by a specially designed turret drill press. Its use in this connection is shown in Fig. 2. In the tail stock spindle of an engine lathe, it gives all the advantages of a turret lathe for many operations. Its use in this manner is shown in

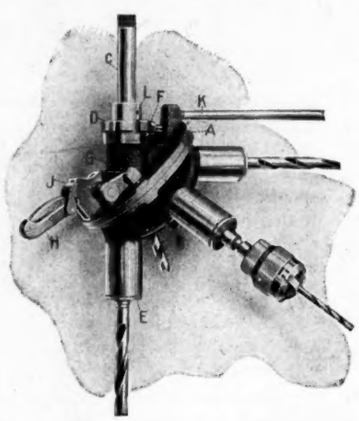


FIG. 1.—THE "DIAMOND" TURRET HEAD.

Fig. 3. Many important operations may be quickly performed when the device is used in the head stock spindle of a lathe, the successive tools being rapidly brought into operation. The application of the device is not

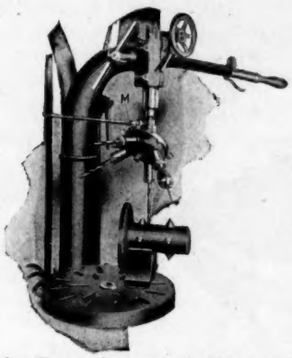


FIG. 2.—THE "DIAMOND" TURRET HEAD IN A DRILL PRESS.

confined to these two types of machines, but it can be used to advantage in boring, drilling and milling machines of standard and special types.

The construction of the device is as follows: In Fig. 1, the turret carrying four or six tool sockets E, rotates upon the cover A, bringing the different tools successively into position for operation. The cover is mounted upon the shank C in such manner that it can rotate. By means of this shank C, the turret head is attached to the spindle of a drill press or other machine. It is necessary to keep the nuts B adjusted, so that the turret will turn easily upon the cover and without lost motion at the joint between the two portions. The clutch lever H and the clutches concealed within the turret attach the tool socket E to the shank C. By the same motion, the clutch lever locks the pin G, holding the turret and cover together and keeping the tool and socket in rigid alignment with the shank. The clutch latch J keeps the clutch in or out of mesh, and the turret is locked or unlocked, as desired. The adjusting nut D is used for taking up end motion caused by wear of the clutch mechanism. The adjusting nut itself is kept from moving when once set by means of the lock bolt F engaging a slot in the periphery.

When the turret head is mounted in a rotating spindle the shank and socket both rotate. Since the turret and cover are mounted upon these, the entire turret head will rotate unless prevented. The force causing this rotation is small, being the friction due to the weight of the machine upon the running parts, and to prevent this rotation a light rod K, Fig. 1, is screwed into a boss cast on the cover, as shown, and permitted to rest against any convenient object. Various other means may be used, for instance that shown at M in Fig. 2, or by means of a pin through the adjusting nut and shank at L, Fig. 3, or at D, Fig. 1.

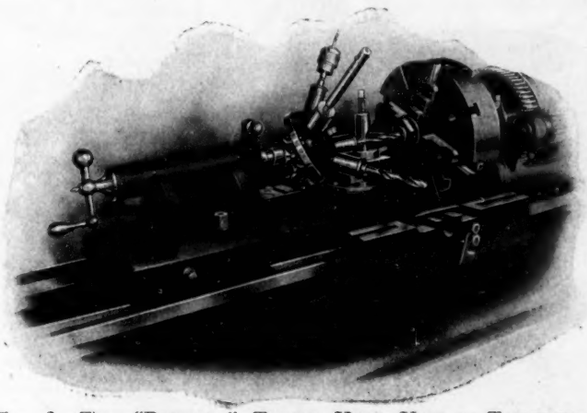


FIG. 3.—THE "DIAMOND" TURRET HEAD USED IN TAILSTOCK OF A LATHE.

The tool that is in operation is the only one in positive mechanical contact with the rotating machine spindle. All other tools are at rest and can be removed or replaced by the operator without danger. The machine can be used for tapping threads in holes it has drilled, either by using a reversing tapping attachment inserted in one of its sockets, or by using it in a drill press having gears for reversing the motion of its spindle. The clutches operating the different tool sockets are so built that they will drive equally well in either direction. When mounted on a rotating spindle, the different drills or tools can be brought into working position without stopping the machine. The device is made in 16 sizes, with four and six holes, and ranging in capacity from ⅜-inch to 3 inches maximum size of drill. The over all length ranges from 8 inches to 26½ inches, and the distance from the end of the drill press spindle to the end of the socket is 5½ and 18¼ inches, respectively, in the largest and smallest sizes. The smallest size is best adapted for use in an 8-inch lathe or a 10-inch upright drill, while the largest size is adapted for use in a lathe of 30-inch swing and upwards, or a drill press of a capacity of 30 inches and upwards.

A NEW LINE OF UPRIGHT DRILLS.

The accompanying illustrations show part of a new line of upright

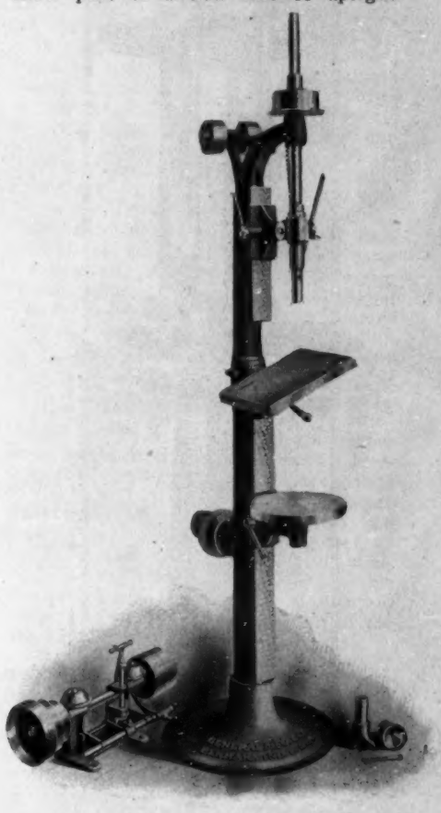


FIG. 1.—15-INCH SENSITIVE DRILL, GENERAL MFG. CO.

drills recently brought out by the General Mfg. Co., Elkhart, Ind. This line comprises a 21-inch upright drill with both plain and indexed tilting table, a 15-inch sensitive drill and a multi-spindle sensitive drill. The latter is built with two, three, or four spindles, the two-spindle machine being here shown in Fig. 2. The sensitive drills have ball bearing spindles. The distance from the column to the center of the spindle is 7½ inches. The single spindle sensitive machine has a tilting table which can be made to

swing about the column in order to allow a lower table to be used. This lower table is adjustable and removable for placing a V or socket center on the column. Other dimensions of this machine are shown in the following table:

Maximum distance spindle to lower table	43 inches
Vertical adjustment of spindle	9 inches
Length of feed	3½ inches
Size of square table	10½ x 10½ inches
Diameter of lower table	9½ inches
Hole in spindle, Morse taper	No. 1
Weight	300 pounds

The 21-inch upright drill is shown in Fig. 3. This machine is also furnished with a tilting table which has an

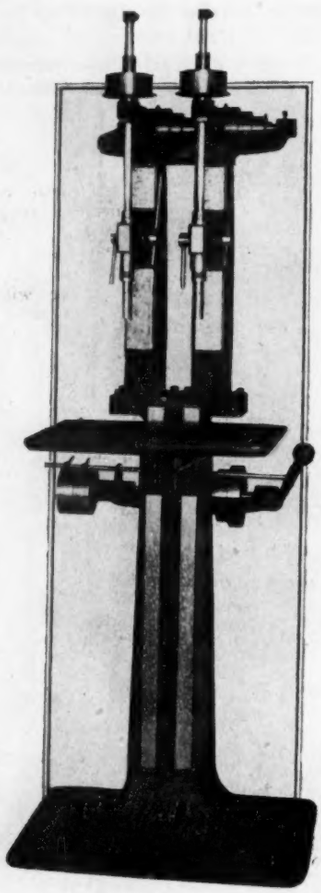


FIG. 2.—2-SPINDLE SENSITIVE DRILL, GENERAL MFG. CO.

indexing device to locate it accurately at 45 or 90 degrees. It can be set and clamped firmly at any angle in less than one minute's time. The drill is rigid and strong and saves time on work requiring several holes to be drilled at different points or angles, giving access to the work from the top and all sides at one setting. The dimensions of the 21-inch upright drill are shown in the following table:

Greatest height of drill	72 inches
Total distance end of spindle to base	40 "
Total distance end of spindle to table	26 "
Column to center of spindle	10½ "
Vertical feed of spindle	9½ "
Weight	600 pounds
Spindle fitted for Morse taper	No. 3

The arm carrying the table can be raised and lowered by a crank and screw in the usual manner. When desired, the machine is furnished with a solid knee instead of the tilting table. All gears are accurately cut from solid steel and the spindles are of high grade steel. The machines

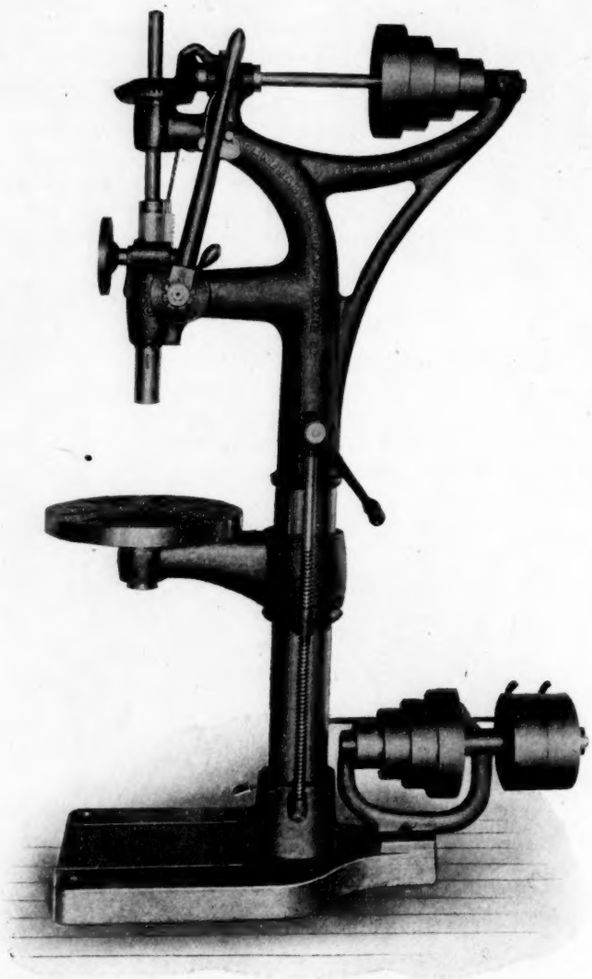


FIG. 3.—21-INCH WIDE DRILL, GENERAL MFG. CO.

are built strong and heavy for driving high speed steel drills.

San Francisco's Activity.—The state of San Francisco's rebuilding work is shown by the summary issued for July, which states that in that period there were granted building permits of the valuation of $4,752,778. Real estate sales numbered 620 of the value of $1,650,000; bank clearings were $176,470,396.11, against $160,631,793.87 in July, 1906, and $148,405,121.81 in July, 1905. The custom receipts were $803,085.96.

THE PURCHASE OF COAL UNDER SPECIFICATON.[1]

J. E. WOODWELL.[2]

With the present knowledge of the proper methods of burning coal under the boiler, nearly all of the coals commercially obtainable may be utilized under appropriate conditions and with an equipment especially suited to the purpose, with a fair degree of efficiency, a proportionately equal return being secured from coals of lower grade. The use of many kinds of coal is dependent upon transportation rates. Certain coals are not applicable by reason of anti-smoke ordinances or regulations, though such restrictions are more often apparent than real, for with proper appliances many coals now rejected may be burned without producing objectionable smoke. Some coals are selected for

[1]Abstract of a paper presented at the Atlantic City (May, 1907) meeting of the American Society for Testing Materials.

[2]Inspector of electric light plants, Treasury Department, Washington, D. C.

their gas producing qualities, freedom from sulphur, etc., others for their coking properties.

It is within the province of the mechanical engineer to plan and install the furnace equipment in order to utilize that coal or class of coal among those available which will produce the greatest return for the net cost. When the kind of coal has been decided upon it is the duty of the purchasing agent to contract for that fuel under explicit terms which will be fair both to the producer or dealer and the consumer.

Ordinary Method of Purchase.

In the evolution for specifications for coal the oldest and most familiar requirement is that the coal of specified name shall be delivered from a given mine or district of known reputation. Without other technical conditions, such a contract neither takes account of the inevitable variations in the quality of the coal in the designated mine or group of mines, nor does it recognize the important influence of methods of mining, cleaning and sizing the coal upon its quality. Moreover, it is frequently not practicable either to secure the condiuous delivery of coal from a given colliery or district throughout the life of a contract or to determine the compliance with this single conditon which forms the essence of the contract. Among the other defects which the plan of purchase upon the reputation of a mine has in common with nearly all other methods not based upon a specification covering calorific value and other features, is the lack of any definite basis for the rejection of unsatisfactory coal or for inferior coal necessarily consumed.

In practice coals of the same class not only vary widely in different localities, but in the same mine, and these variations may result from differences in quality in the same or different beds, or in the methods employed in mining, cleaning and sizing the coal. In the case of anthracite it is often the practice to dump the output of a large number of mines producing coal of different heating values and ash contents into a central yard, from which it is shipped to dealers and consumers as a mixture. Under such conditions uniformity cannot be expected, and when coal of the desired quality is secured it is the result of chance. Even with the best intentions on the part of the operator or coal merchant, actual deliveries of coal purporting to represent the output of a given district or mine of reputation will frequently be greatly at variance with the nominal standard accepted as the basis of a contract. To cite an illustration, a considerable quantity of coal actually furnished by a reputable dealer under terms of a carefully drawn contract in which the name of the coal bed from which deliveries were to be made was specified, actually contained over 40 per cent ash as compared with an assumed ash content of six per cent, resulting in a corresponding reduction of about 50 per cent in heating value. Moreover, the coal passed the visual inspection of officers charged with the duty of checking the weights, and of noting the presence of slate, dirt, etc.

Purchase by Analysis.

Another plan is to purchase coal on the basis of a standard and guaranteed analysis and to permit rejection if the variation from that standard exceeds certain established limits. The success of this plan depends to a considerable degree upon actually securing coal within the limits set for rejection, for in an important contract, or in the case of inadequate storage facilities requiring constant deliveries, the actual rejection of the coal might subject the purchaser to the greater loss due to delay and embarrassment in replacing the delivery, while a forced acceptance of the inferior coal without adjustment of price would in effect nullify the force of the contract. Furthermore, in the latter case no comparative basis of settlement would be provided in the event of a necessary substitution of another coal for the one specified.

Other specifications have been drawn on the basis of assigning limiting values in the proximate analysis. Another form, also states the limits in the proximate analysis, but provides in addition for the adjustment of payments on the basis of certain variations from the standard analysis as set forth in detail.

Such contracts are usually drawn to include one or more specific kinds or grades of coal which have been found to operate with satisfactory economy under well established plant conditions. With this object in view, such a specification precludes from competition many coals whose analysis approaches, if it does not regularly exceed, the limiting values.

Turning now from that class of contracts which are based entirely upon an analysis to the specifications which are based more strictly upon the thermal values of the fuel, there are many illustrations of the general recognition of the necessity of the B. T. U. rating as a contract standard.

Purchase by Thermal Value.

Some of the largest central stations and private corporations have adopted as a basis of coal purchase specifications involving the thermal values of the fuel. A specification typical of this class reads as follows:

I. The company agrees to furnish and deliver to the consumer ..... at such times and in such quantities as ordered by the consumer for consumption at said premises during the term hereof, at the consumer's option, either or all of the kinds of coal described below; said coals to average the following assays:

Kind of Coal.			
Of size passing through screen having circular perforations in diameter....—in.	—in.	—in.	
Of size passing over a screen having circular perforations in diameter....—in.	—in.	—in.	
Per cent of moisture in coal as delivered	—	—	—
Per cent of ash in coal as delivered	—	—	—
B. T. U. per pound of dry coal	—	—	—
From following county....	—	—	—
From following state.....	—	—	—

Coal of the above respective descriptions and specified assays (not average assays) to be hereinafter known as the contract grade of the respective kinds.

II. The consumer agrees to purchase from the company all of the coal required for consumption at said premises during the term of this contract, except as set forth in paragraph III below, and to pay the company for each ton of 2,000 pounds avoirdupois of coal delivered and accepted in accordance with all of the terms of this contract at the following contract rate per ton of each respective contract grade, at which rates the company will deliver the following respective numbers of British Thermal Units for one cent, the contract guarantee.

Kind of Coal	Contract Rate per ton.	Contract Guarantee.
	.....$.....Equal to....net B. T. U. for 1c.	
	.....$.....Equal to....net B. T. U. for 1c.	
	.....$.....Equal to....net B. T. U. for 1c.	

Said net B. T. U. for one cent being in each case determined as follows: Multiply the number of B. T. U. per pound of dry coal by the per cent of moisture (expressed in decimals), subtract the product so found from the number of B. T. U. per pound of dry coal; multiply the remainder by 2,000 and divide this product by the contract rate per ton (expressed in cents) plus one-half of the ash percentage (expressed as cents).

III. It is provided that the consumer may purchase for consumption at said premises coal other than herein contracted for for test purposes, it being understood that the total of such coal so purchased, shall not exceed five per cent of the total consumption during the term of this contract.

IV. It is understood that the company may deliver coal hereunder containing as high as three per cent more ash and as high as three per cent more moisture and as low as 500 fewer B. T. U. per pound dry than specified above for contract grades.

V. Should any coal delivered hereunder contain more than the per cent of ash or moisture or fewer than the number of B. T. U. per pound dry allowed under paragraph IV hereof, the consumer may, at its option, either accept or reject same.

VI. All coal accepted hereunder shall be paid for monthly at a price per ton determined by taking the average of the delivered values obtained from the analyses of all the samples taken during the month, said delivered value in each case being obtained as follows: Multiply the number of B. T. U. delivered per pound

of dry coal by the per cent of moisture delivered (expressed in decimals); subtract the product so found from the number of B. T. U. delivered per pound of dry coal; multiply the remainder by 2,000 and divide this product by the contract guarantee; from the quotient (expressed as dollars and cents) subtract one-half of the ash percentage delivered (expressed as cents).

Another form of this kind in force at this time and even more rigid in many particulars as applying to a particular kind of coal virtually specified is of especial interest as indicating a full appreciation of the financial importance of safeguarding the interests of large consumers in the effort to secure the best thermal return for the expenditure. The contract requirements are drawn with a view to procuring a definite kind of coal described as a "good steam, coking, run-of-mine, bituminous coal, free from all dirt and excessive dust, a dry sample of which will approximate the company's standard in heat value and analysis, as follows:"

Carbon	71	per cent
Volatile matter	20	" "
Ash	9	" "
	100	" "
Sulphur	1.5	" "
B. T. U.	14,000	

The price paid by the company per ton, per lighter of coal, is based upon a table of heat values for excess or deficiency of its standard. This table places an arbitrary valuation of one cent for each 50 B. T. U. excess or deficiency. (If this table is calculated in direct proportion to the price of the coal, that price would evidently be $2.82.) In addition to the corrections for heating value as determined by a Mahler bomb calorimeter, the price paid is subject to deductions for excess of ash, volatile matter, sulphur or dust, or for a shortage in the standard lighter quantity.

Volatile matter and ash are each penalized to the extent of two cents per ton for each one-half of one per cent above the standard, while excess of sulphur is penalized to the extent of six cents per ton for the first quarter of one per cent excess and four cents per ton for each succeeding quarter of one per cent up to 2.5 per cent, above which a deduction of twenty cents per ton is made. A further deduction of seven cents per ton is made if any lighter of coal delivered at the company's docks contains less than 700 tons.

With respect to business clauses the contract is carefully drawn, and such subjects as bond, payments, deliveries, docking, towing and demurrage, and method of sampling, testing and arbitrating test results are all explicitly covered. The amount of coal consumed by this company, over 350,000 tons per annum, valued at about a million dollars, undoubtedly fully justifies such elaborate contract conditions.

U. S. Government Specifications.

For the average consumer, however, a much simpler form involving corrections for variation in heat units and ash only, may afford adequate protection. As a result of experience gained in the purchase and testing of coal for the government buildings located in all parts of the country combined with the broad technical knowledge of the subject gained by the fuel testing division of the U. S. Geological Survey, which, under the direction of J. A. Holmes, has actively and most effectively co-operated in the matter, a broad contract form has been developed. After its preliminary preparation it was carefully reviewed by prominent coal dealers, engineers, private corporations and others interested in the subject, who, as a rule adjudged it to be fair and just to both parties. A meeting of the National Advisory Board for Fuels and Structural Materials appointed by the president was then called to consider the subject, and after certain modifications in form and arrangement its adoption was recommended. The specification is drawn up so as to enable users to describe the coal desired, which may be anthracite or bituminous, and in the latter case with such proportion of volatile matter as will include either eastern or western varieties as may be demanded. Unlike some of the specifications which have been drawn with special reference to a particular kind of coal, this form has been made sufficiently flexible to meet the varying requirements due to different locations throughout the United States and also the special needs of the local equipment.

Under this plan also, bids may be secured for a number of classes of coal procurable in a given market, and then compared with a view to selecting the one showing the highest economic value. What is actually desired is not necessarily the cheapest or the highest grade of coal *per se*, but the coal which will insure the greatest net economy in plant operation, and to attain this object it appears undesirable to establish an absolute standard for the fuel which would tend to limit the sources of supply.

It is intended to establish limits which are wide enough in any case to permit the use of the output of any mine or group of mines, provided proper care is exercised in mining and picking out slate, bone, etc. With these points in mind, it is only necessary for the bidder to select coal for his proposal which will meet the description given and permit deliveries within the limits set. The bidder is also required to state the heating value of the coal, as delivered, in B. T. U. and the percentage of ash in dry coal, with a view to the use of such statements as a basis for payment in connection with the stated price per ton. It is expected that the standard thus established by the contractors will be such as to require the least correction applying to deliveries for variations in B. T. U. and ash, but is not expected that all deliveries will be absolutely uniform or agree exactly with the standard. It is necessary, however, that all deliveries shall be within fixed maximum limits.

Corrections.

The heating value, expressed in B. T. U. of coal containing approximately the same percentage of ash is essentially a direct measure of the actual value to the purchaser, and for this reason the specifications provide for an adjustment of payment in direct proportion to the variation in heat units in the coal as received. As the coal is weighed when delivered and the payments are based also upon the price per ton, it is necessary to determine the heating value of the coal in the condition in which it is received containing whatever moisture may be present at the time.

A further correction in payment will be made for variation of the ash in dry coal in order to take account of the cost of handling additional fuel and ash and its effect on the capacity of the boiler and furnace.

The system of sampling, analyzing, and testing coal delivered under the government contracts will be under the supervision of the fuel testing division of the United States Geological Survey, in order to insure reliability and impartiality.

The application of this system will not only enable the award of a contract to be made in an equitable manner, but will also remove many of the usual causes for dispute as to the character and quality of the coal subsequently delivered, and provide a satisfactory basis for the adjustment of payments for differences in quality in favor of the party in whose interest it is due.

It is believed that the enforcement of the provisions of the specifications will operate equitably both with respect to the government and to the contractor, inasmuch as a premium is provided as penalty, and will guarantee adequate protection to each party.

As to the necessity for some such system, experience in applying a specification which penalizes a deficiency in heating value only, has developed an average deficiency of about 3.5 per cent, which on contracts aggregating $200,000 represents the sum of $7,000 of which not more than $1,000 can be charged for testing. Individual deliveries have in practice as mentioned before, shown as high as 47 per cent of ash on a contract standard

of about 6 per cent, and less than one-half of the stipulated heating value. Under the accompanying specifications coal of this sort would be subject to rejection, or, if used, would not command a payment adequate to reimburse the contractor for the cost of cartage alone. It is also doubtful if such coal is of sufficient value to the user to repay the cost of firing and the subsequent handling of ashes.

This system of coal purchase has been established by the government for economic gain and it has been applied therefore with discrimination as to the size of the contract which will warrant such procedure. In general it has been justified practically on contracts exceeding $2,000 in value, though other factors than price frequently influence the choice of methods of purchase, such as limited competition, availability of coal market, etc.

Experience in the use of this method shows that frequently the correction for moisture influences the heating values of coal quite as much as variation in the ash content. In adjusting payment, therefore, on the basis of the coal as received by the consumer the brunt of the proposition is thrown upon the dealer who should make conservative allowance for probable variations in establishing the contract standard.

In certain instances bidders have submitted samples of coal with bids with a view to using the results of analysis and test as a contract guarantee. In such cases, under the stress of competition in quality, as well as price of the coal, it is to be expected that a sample would be of exceptional rather than average quality. In other instances, in which the contract liability assumed in stating heating values has developed a lack of knowledge of the performance of the fuel on the part of the bidder, the contract standard is so underrated as to result in a continuous increase in price by the payment of premiums.

In conclusion it seems proper to emphasize the importance of bringing about a better understanding between the producer and the consumer, in order that the coal operator may understand how to market his product directly or through a local dealer with reference to the intrinsic value to the user, i. e., the thermal and economic values of the fuel.

The general application of this specification depends upon the co-operation between the mine operator and the dealer, so that the operator may receive the benefit from high quality and stand for the loss due to shipment of inferior coal.

The success of this method also depends in a large measure upon the knowledge possessed by the mine operator or dealer of the characteristics of the coal handled and upon the ability to control the variations in quality due to methods of mining and cleaning.

BAR IRON SCHEDULE

As Fixed by Conciliation Board Accepted by Republic and Western Association.

The Republic Iron & Steel Co. and the Western Bar Iron Association have notified the Amalgamated Association of Iron, Steel and Tin Workers that they will accept the award of the conciliation board. The award became operative Aug. 12, 1907. Firms which had previously signed the Toledo scale of the Amalgamated Association are as follows:

American Sheet and Tin Plate Co., Pittsburg.

Standard Chain Co., Columbus, O.

Granite Iron Rolling Mills, St. Louis. Follansbee Bros. Co., Follansbee, W. Va.

Zug & Co., Sable Iron Works, Pittsburg.

Pittsburg Forge & Iron Co., Allegheny.

Youngstown Sheet & Tube Co., Youngstown, O.

Wayne Iron Works, Brown & Co., Pittsburg.

Lockhart Iron & Steel Co., McKees Rocks, Pa.

The Griffiths Charcoal Iron Mills, Washington, Pa.

The Licking Coal & Iron Co., Inc., Covington, Ky.

The Western Steel Car & Foundry Co., Anniston, Ala.

The Ewald Iron Co., Louisville, Ky.

The Kansas City Bolt & Nut Co., Kansas City, Mo.

The Fort Worth Iron & Steel Co., Fort Worth, Tex.

The American Rolling Mill Co., Middletown, O.

The Cleveland Hardware Co., Cleveland.

The Empire Iron & Steel Co., Niles, O.

Carnahan Tin Plate & Sheet Co., Canton, O.

The Niles Iron & Steel Co., Niles, O.

The Youngstown Iron & Steel Roofing Co., Youngstown, O.

N. & G. Taylor Co., Cumberland, Md.

Kittaning Iron & Steel Mfg. Co., Kittanning, Pa.

The Tyler Tube & Pipe Co., Washington, Pa.

The Railway Steel Spring Co., Detroit.

The A. M. Byers Co., for the Clearfield Iron & Steel Co., Clearfield, Pa.

Newport Rolling Mill Co., Newport, Ky.

Whitaker-Glessner Co., Wheeling, W. Va., and Martins Ferry, O.

Westerman & Company, Lockport, N. Y.

Atlanta Tin Plate & Sheet Mill, Atlanta, Ind.

The Top Sheet Department, Wheeling Steel & Iron Co., Wheeling, W. Va.

Pope Tin Plate Co., Steubenville, O.

Sharon Steel Hoop Co., Sharon, Pa.

SEVENTY-FIVE BRIDGES

Will Be Erected By the Western Pacific Railway.

(Special Correspondence.)

San Francisco, August 16.—The Western Pacific railway, which is building a competing trans-continental line, will commence its construction work within a few days on its series of iron bridges over rivers and creeks, which are necessary on the one stretch of the road from San Francisco to Wells, Nevada, a distance of 700 miles. Wells is near the Humboldt river, which the Western Pacific must bridge not less than 33 times. The 75 railroad bridges have an aggregate length of almost three miles, and require a total of 20,000 tons of structural steel. The first order of 2,000 tons of structural bridge steel was placed a few days ago with an eastern firm through the Gould offices in New York, which will order all material for the construction in the east. The following gives the principal bridges and their lengths: Mokelumne bridge, 162 feet; Consumnes bridge, 200 feet; American river bridge, 560 feet; Yuba river, 400 feet; Middle Fork Feather river bridge, 442 feet; North Fork Feather river, 448 feet; North Fork Feather river, second bridge, 260 feet; Chandler creek, 640 feet; Willow creek bridge, 1,000 feet.

Chandler creek, up in the wilderness of the mountain slopes, is to be crossed by a trestle instead of a standard bridge. The trestle is to be built on six steel towers, the smallest to be 40 feet high, and the tallest 110 feet. Across the level top of those towers there will be six spans of 60 feet each, two spans of 50 feet each, and six spans of 30 feet each. Willow creek, a tributary of the Feather river, still farther up in the Sierra slopes, is to be spanned near Clairville with a structure resting on ten towers, ranging in height from 45 to 165 feet, and covered by eleven spans of 60 feet each, four spans of 40 feet each, and six spans of 30 feet each.

NEW CAR COMPANY

Formed to Manufacture Steel Rolling Stock—New England Industries.

(Special Correspondence.)

Worcester, Mass., Aug. 19.—At the annual meeting of the T. H. Buckley Car Mfg. Co., Worcester, Aug. 13, that company was voted out of existence. In its stead has arisen the Buckley Car Co., with Louis J. Harris, New York, at its head, supported by the Harris Palatial Car Co., of which Mr. Harris is president. The intention is to unite the steel works of the Eastern Bridge & Structural Co., Worcester, with the interior wood finish department of the Buckley Car Mfg. Co., formerly builders of lunch wagons, evolving thereby full construction of steel drawing, dining and private cars. Mr. Harris is president and general manager of the new company, John T. Flanagan of the old Buckley company and of the Palatial Car Company, is secretary and treasurer. The directors elected are Louis J. Harris, Henry C. Tuxbury and J. Odell Fowler, all of New York; John T. Flanagan, Winthrop Hammond, Horace M. Richardson and Charles T. Tatman, all of Worcester. The manufacture of lunch carts will be carried on as previously, and the new company will also engage in the manufacture of steel cars. The deal is a practical amalgamation of the three firms mentioned, led by Mr. Harris.

The Waterbury Machine Co., Waterbury, Conn., has awarded the contract for an addition to its plant, plans calling for a one-story brick building 40 x 90 feet, a boiler house 30 x 40 feet, and a coal room. The new plant will be used as a machine shop.

Ground will be broken by C. F. Roper & Co., Hopedale, Mass., in a few days for a two-story shop to be used for making a speed controlling, reversing propeller to be attached to motor boats, the invention of Charles F. Roper. Other kinds of machinery will also be manufactured, the concern being financially backed by Gen. Wm. F. Draper, who recently resigned from the Draper Co. The main new building will be 40 x 60 feet, with large basement. The brass foundry and stock room will be 30 x 48 feet, one story. Persons well acquainted with the new enterprise say it is but the beginning of a plant which will be a rival of the Draper Co. Since the retirement of Gen. Draper from the Draper Co., Mr. Jonas Northrup, a brother of the inventor of the Northrup loom used in the Draper plant, and Everett S. Wood, formerly draftsman for the Draper Co., have handed in their resignations, and it is said both will be employed by the new company. There are rumors of still further resignations from the Draper Co. as soon as the new Roper plant becomes more tangible. Mr. Roper was formerly in the employ of the Draper Co., resigning several years ago to perfect his inventions. Clare H. Draper, son of Gen. Draper, is a member of the new Roper firm.

The Holmes Machine Co., Boston, recently petitioned into bankruptcy by creditors, has filed a schedule showing liabilities of $48,453, and assets $94,313.

The Engineering Specialty Co., manufacturers of electrical goods, is arranging to move to Stamford, Conn. The company is now at Meriden. It will build a new plant in Stamford, the main factory being 40 x 150 feet. The force of the firm will then be about doubled.

The plant of the Greystone Mfg. Co., of Greystone, Conn., makers of wire chains, key rings and hardware specialties, has been sold at auction. The property was bought by its former president, Edward S. Robbins, for $825. This affords but a small dividend to the creditors.

A strike is on at the works of the Fore River Ship Building Co., Quincy, Mass., and the company has brought a bill in the Superior Court seeking an injunction to restrain the strikers from picketing or intimidating employes or persons desirous of entering the employment of the company.

The Washburn Wire Works has commenced the foundations at Phillipsdale, R. I., for its five new buildings, to accommodate its Auburn plant when it is removed.

The American Typewriter Co., which has been located in the plant of the Williams Typewriter Co., Derby, Conn., has leased quarters at Shelton, Conn. The Williams company will continue to make parts for the American company but the latter will hereafter do all the assembling.

The Yale & Towne Mfg. Co., Stamford, Conn., maker of builders' hardware, has filed certificate increasing its stock from $1,000,000 to $1,500,000. The recent legislature authorized the company to increase its capital to $5,000,000, and further issues of new capital will likely be made from time to time.

The Otis-Fenson Elevator Co., Toronto, is establishing a branch at Vancouver, B. C.

MANY INQUIRIES

In the Cincinnati Machinery Market—German Order Pending.

Office of THE IRON TRADE REVIEW,
124 Government Place,
Cincinnati, Aug. 19.

The number of orders on hand and inability to make early deliveries is responsible for some loss of orders, but there is a very good line of inquiry right along, although the call for machine tools is not so heavy as before the advent of the summer season. Cancellations are few and business on the books is being held very satisfactorily. The outlook for next year's foreign trade is good, and it is reported that some German interests were canvassing this market during the week for 300 upright drills. This large order was wanted for prompt delivery, or this year's shipment. Such inquiries as this are decidedly encouraging as to what may be expected.

In the discussion of the general business situation, there was but little pessimism to be noticed. The Pope failure was a matter of comment and it was feared that undue significance might be attached to it, while, as a matter of fact, the failure itself was not of particular importance, excepting as it reflected the stringency of the money market. It is interesting to note in this connection that Dun's Review takes this same view and calls attention to the fact that the assignment was caused by monetary pressure and not lack of business.

The Kern Machine Tool Co. is preparing to add to its shop about 6,000 square feet of floor space. The addition will be 50 x 120 feet. Phil Fosdick, who is connected with this company, is now in Europe on a business and pleasure trip.

The Mueller Machine Tool Co. is preparing to move into its new shop on Colerain avenue, between Queen City and Draper streets, about the first of September.

J. D. Doane, vice president and general manager of the American Tool Works Co., is convalescing from a threatened attack of typhoid fever.

George Stewart, president of the Bradford Machine Tool Co. is on a vacation trip in Michigan, and will probably not return until the middle of September.

R. K. LeBlond, of the R. K. LeBlond Machine Tool Co., is expected to return from Europe early in October.

B. B. Quillen, of the Cincinnati Planer Co., is making a tour of the west, and is expected to return in about two weeks.

HANGING ROCK REGION.

Rapid Work in Building New Furnace.—Another Plant Proposed.

(Special Correspondence.)

Ironton, O., Aug. 19.—The Ironton Furnace Co. is erecting a large new furnace at Ironton, the company having been incorporated with a capital stock of $300,000. The work of construction has been rushed and already the three immense stoves and the stack are up and the necessary buildings completed. It is the hope of the company to go into blast early in January and the contractors state that, if they meet with no great delays, the completion of the plant will mark a new record in rapidity of blast furnace construction.

The work of erecting the main building for the Malleable Iron Co. plant at Ironton, the company having recently incorporated with a capital stock of $150,000, is now under way and the plant will be ready for operation, it is expected, before the first of the year.

T. H. B. Jones, Jas. Bull and other Ironton associates, have acquired the O'Neill farm just west of Ironton and in connection with Cincinnati capitalists, expect to erect a new blast furnace on the site. If the project is successful—and the promoters say they have the necessary financial encouragement—the company would incorporate for $200,000 and erect a furnace of large capacity. Mr. Bull was for many years connected with the Hanging Rock Furnace of Means, Kyle & Co., now the Hanging Rock Iron Co., and is an experienced iron man.

Col. H. A. Marting, president and general manager of the Marting Iron & Steel Co., owner and operator of the historical "Big Etna" stacks, is personally superintending the erection of the new stack of the Ironton Furnace Co. and says the capacity of the new plant will be practically the same as that of "Big Etna," although more modern ideas of construction have not necessitated putting so much material into the new plant. A new departure in the erection of this plant, for the Ironton region at least, is the use of individual stacks for each stove. Trackage facilities are being put in which will enable the company to deliver its cinder direct to the Norfolk & Western, which will utilize it in extensive double-tracking plans on this division.

The big plant of the Superior Portland Cement Co. at Superior, a few miles north of Ironton on the D. T. & I., is practically completed and the machinery is being housed. It will have a daily capacity of probably 2,000 barrels when fully operated. Cement was used extensively in the construction of the big buildings, Southern Ohio product being used.

The York Portland Cement Co. is again rushing work on the finishing touches to its new plant just east of Portsmouth and will make a trial run in the early fall. The death of Dudley B. Hutchins, vice president and general manager, will probably result in Secretary E. D. Stevens assuming the active management of the plant. Mr. Stevens was until recently sales manager for the Portsmouth Harbison-Walker Co. in this district.

The recent announcement that the Bird Iron Co., operating the remodeled Vesuvius stack at Culbertson, near Ironton, had declared a dividend of 50 per cent, making a total of 70 per cent for the first seven months of 1907 and equally as good prospects for the second half, has stimulated investment in iron stocks in that section and promoters of new blast furnace enterprises who have practical experience, have had no difficulty in placing stock.

One of the largest stock deals recently made in this section was the sale by Toledo parties to S. B. Steece, the well-known iron and cement manufacturer of Ironton, of $16,000 of the stock of the Belfont Iron Works Co. at Ironton. The quotation at which the stock sold was not made public, but it is said to have been high, nail mill stocks having fared well in the prosperity attending the strength of the iron market.

The strike at the plant of the Ironton Portland Cement Co., which had been in effect for some months, has been declared off by the men. The plant was being operated at almost full time and employes saw that their case was hopeless. Recognition of the union was the principal demand and the company declined to treat on such a basis.

The Studebaker Bros. Mfg. Co., South Bend, Ind., has issued a handsome folder, printed in yellow, green and black, which is being distributed at the company's exhibit at the Jamestown Exposition. The contents of the folder are in keeping with the exposition, the first four pages being devoted to a description of historic Jamestown, illustrated by views, showing the various points of interest about that city. The remainder of the folder contains a short description of the various vehicles, built by the Studebaker company, fully illustrated.

COAL LITIGATION

Between Dominion Companies Continues—Novel Experiment in Boat Construction.

(Special Correspondence.)

Toronto, Aug. 18.—In the suit of the Dominion Iron & Steel Co. against the Dominion Coal Co., which is still in progress, a very large number of witnesses have given evidence for the defense. Dr. Ami and Hugh Fletcher, of the Dominion Geological Survey, were called as experts and swore that No. 6 mine, from which the rejected coal came, was on the Phalen seam, as was also the Caledonian mine. Many officials of the company and others testified that the coal was a good coal for domestic and steam purposes. Chas. Fergie, the company's superintendent of mines, stated that it was a good merchantable coal and that tests as to its steam-raising quality showed a fair average with tests of other coals. He considered coal of 6 per cent sulphur and 13 per cent ash good coal, but did not contest the statement that the coal was unfit for coke and steel manufacturing purposes. The defense has made no attempt to prove the suitability of the coal for the manufacture of steel, and the question at issue has apparently narrowed down to whether such a quality of coal was called for by the contract.

The Canadian Pacific Railway Co. has let contracts for the construction of a steel bridge on the Crow's Nest Pass branch over the Belly river. It will be over a mile in length and at the center will rise 291 feet over the surface of the water. It will be carried on steel girders stretching from piers in the river. The steel supports will rest on piers built of concrete piles. The general contract for the bridge was awarded to John Gunn & Sons, Winnipeg, and that for the concrete piling to the Raymond Concrete Pile Co. of Canada. The terms are not given out.

Joseph W. Yakey, Milford Riddle, Frank Phillips and others, have obtained a charter of incorporation for the Canadian Jack Co., Ltd., capitalized at $25,000, to manufacture a lifting jack combination farm tool at Windsor, Ont.

Victor Automatic Carriers, Ltd., with an authorized capital of $20,000, has been incorporated to manufacture electric motors and machinery at Montreal, by Victor Filbeau, Frederick H. Markey, Ronald C. Grant and others.

ELECTRIC SMELTING

Said to Be Successful on the Pacific Coast—Low Cost of Ore.

(Special Correspondence.)

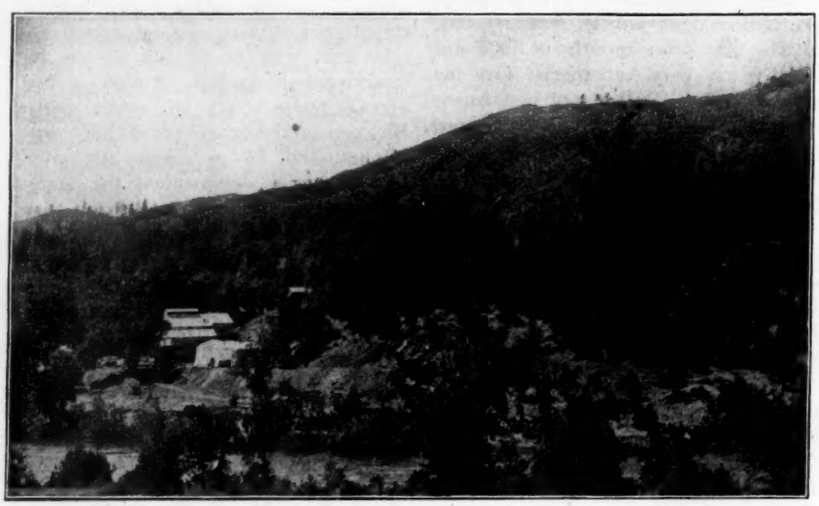
San Francisco, Aug. 16.—Electric smelting of iron ore, started July 4, is pronounced successful. It is claimed that the plant at Heroult, near the Pitt river, will be the means of converting the large tonnage of iron ore between the Pitt and the McCloud rivers into pig iron at a lower cost than it can be bought in the east or in Europe. It is asserted by those interested that the success of the numerous tests opens a new era for California industries, and especially for iron manufacture and for construction requiring large quantities of structural iron and steel. The smelter building, charcoal kilns and transformer house are on the main line of the Northern California Power Co., whence the electric power is derived for the smelter. The Sacramento Valley & Eastern railroad passes between the smelter and the Pitt river. The railroad runs from the Delamar copper smelter to the Sacramento river, where it joins the main line of the Southern Pacific Co., and passes within six miles of the iron smelter. A deposit of limestone in abundant quantity is found close to the iron ore, and timber is to be had in unlimited quantities for charcoal. The Northern California Power Co. is able to furnish unlimited power to run the smelter. The iron mines are located beyond the divide, one mile distant from the smelter. The ores taken from the mines are magnetic and assay from 68 to 70 per cent metallic iron with 0.010 to 0.018 phosphorus, are very low in sulphur and insoluble, running about 2.1 to 2.3. Charcoal is made on the premises in kilns and runs 72 to 77 per cent fixed carbon. The limestone which is in contact with the iron deposit assays 98.45 carbonate of lime. By means of an aerial tramway which is to be installed, the ore can be quarried and delivered to the furnace at less than $1 a ton.

In the test runs, tappings of six tons at a time have been made, and it is calculated that when the furnaces will be running regularly, the output of iron will be from 20 to 25 tons a day. As soon as the actual operating shall be known and prove favorable, it is the intention of the company to enlarge the capacity of the plant.

Some 20 years ago an attempt was made to smelt iron on the Pacific coast. Furnaces were erected in California, Oregon and Washington, which turned out pig iron in excess of 30,000 tons, but all the furnaces proved financial failures. Except for spasmodic runs of one furnace in Washington, the rest have been scrapped.

All iron and steel, both crude and in their advanced manufacture, are imported from the east or Europe. Freight charges on raw material have precluded manufacturing on the Pacific coast. With the establishing of smelting by electric process, which will approximate in cost the smelting of iron ore by blast furnaces in the Mississippi basin, a foundation will be laid for manufacturing on the Pacific coast which will commercially exclude importation from abroad.

Iron ore deposits in California, although not yet fully exploited, are believed to warrant the erection of a large plant on the Pitt river.



ELECTRICAL SMELTING PLANT ON THE PITT RIVER, CALIFORNIA.

The Henry & Wright Mfg. Co., Hartford, Conn., makers of drill presses and special machinery, has bought a tract of land 400 x 600 feet on which to build a new plant. Plans will be drawn at an early date.

COST OF STRIKES

As Discovered by Report of Treasurer of International Molders' Union.

At the recent Philadelphia convention of the International Molders' Union, the report of the treasurer indicated how heavy the expenses of strikes had been. The amount contributed to the strike fund, since Sept. 1, 1902, including a balance of $4,237 on hand that day, was $1,600,490. Some of the principal expenditures for strikes were as follows:

Philadelphia	$117,769
Cleveland	57,374
Toronto	12,957
Akron, Ohio	10,449
Providence	12,359
St. Louis	30,712
Springfield, Ohio	13,860
Syracuse	13,340
Boston	13,252
Utica	76,719
Kansas City, Mo.	15,520
San Francisco	10,299
Toledo	12,262
Minneapolis	18,585
Port Chester, N. Y.	12,817
Moline, Ill.	53,539
Beloit, Wis.	22,973
Racine, Wis.	30,445
Scranton, Pa.	20,459
Los Angeles, Cal.	14,216
South Milwaukee	22,647
Milwaukee	165,019
Cincinnati	32,199
Worcester, Mass.	68,491
Indianapolis	17,892
Pittsburg	10,115
Buffalo	35,524
Columbus, Ohio	29,482

These expenses do not include those of conference boards and the expenses of officials while traveling.

Drawback Allowed.—The treasury department of the government has extended its instructions allowing a drawback on the exportation of mowers and reapers of various types and sizes in part with the use of imported pig iron in such a way as to cover other agricultural machinery manufactured by the same firms. The instructions of the department of May 7, 1907, providing for allowance of drawback on the exportation of castings manufactured by the West Side Foundry Co. of Troy, N. Y., have been extended to cover the export of castings manufactured by the Isbell-Porter Co., of Newark, N. J.

Advance Technical Training.—The Jones & Laughlin Steel Co. has undertaken to provide the equipment needed for the manual training department of the Morse schools, Pittsburg, inaugurating a movement which is expected to establish facilities for preliminary technical education in the public schools of that city. Other manufacturers are looked to to join in the project.

Slump in Stock Sets New Low Mark.

Another week of semi-panicky conditions has prevailed in the stock market, and securities have been forced to the lowest level known in the market since the depression of 1903. The declines have been extremely severe, amounting to an average of 5 points in prices. The sentiment of the hour has communicated itself in a rather remarkable manner to the leading industrials, only one stock in the entire list having been able to escape the downward movement. Sloss-Sheffield Steel & Iron common gained 1½ points in the period under review, due in a large measure to the declaration of the regular quarterly dividend in the week. This was the only security to show a gain, although several others held to their positions of a week ago because of the small volume of trading in them. New York Air Brake again dropped smartly, having a loss of 12⅛ points, while Republic Iron & Steel preferred was reduced 10¼ points and Allis-Chalmers preferred lost 8 points. Declines in United States Steel were 1⅛ points, common, 3⅜ points, preferred and 5 points, bonds. Although Wall street, as a rule, attributes the declines to the anti-corporation policy of the national and state administrations, the primary underlying cause is believed to be the monetary situation, which is troubling foreign markets as well as our own. The transfer to the hands of a receiver of the affairs of the Pope Mfg. Co., as well as the practical failure of a New York state bond sale, and the rise in the bank of England's discount rate to 4½ per cent, despite the marked improvement in the condition of the bank, contributed to promote the market's weakness. The week has not been without some favorable features. The low prices of stocks have attracted, on a large scale, bargain buying from an investment public and as the purchases have largely been taken from the speculative center, they have helped the financial status. Through the contraction in loans of $14,231,200, the New York associated banks were enabled to add $1,533,525 to their surplus reserve, leaving the total reserve at $9,294,075, against $7,101,500 the corresponding date in 1906. The banks lost in cash $2,828,300 and the deposits fell away $17,447,300. Liquidation on the part of weakened accounts made the total volume of trading on the New York stock exchange in the week 5,145,964 shares, against 4,402,400 shares last week and 7,531,930 shares the corresponding date of 1906. Exclusive of government bonds, total sales of these securities aggregated $9,790,000, against $5,375,000 last week and $10,194,000 in 1906.

THE LEADING INDUSTRIAL SECURITIES.

	Clos'ng Quo. Aug. 17	Changes in Week	Date 1907 Ann. M't'g	Stock Outstanding	Dividend Basis	Dividend Last Paid	Dividend Date Last Div. Pay.
Allis-Chalmers	6⅜	—2⅞	Sept. 5	19,820,000		.....	.....
Allis-Chalmers pr	18	—8		16,150,000	7 cum	.....	Feb., 1904
American Can	4⅛	— ⅝	Feb. 7	41,233,300		.....	.....
Am. Can pr	44½	—5½		41,233,300	7 cum	5	Apr., 1907
Am. Car and Fdy	37	—1¾	June 27	30,000,000		2 Q.	Apr., 1907
Am. Car and Fdy pr	96	—3¾		30,000,000	7 n. c.	7	Apr., 1907
American Loc	50½	—2¼	Oct. 5	25,000,000		1¾ Q.	May, 1907
American Loc. pr	100	—4½		24,100,000	7 cum	1¾ Q.	July, 1907
American Ship	68	—3	Oct. 2	7,600,000	6	1 Q.	June, 1907
American Ship pr	103½	.....		7,900,000	7 n. c.	1¾ Q.	Jan., 1907
Am. Steel Foundries	5¾	— ¼	Oct. 1	15,810,000		.....	.....
Am. Steel Foundries pr	32	—2		17,240,000	6 cum	.....	Aug., 1904
Barney & Smith	65	.....	June 4	2,000,000	4	1 Q.	June, 1907
Barney & Smith pr	128½	.....		2,500 000	8 cum	2 Q.	June, 1907
Bethlehem Steel	10	—3	April 2	14,862,000		.....	.....
Bethlehem Steel pr	32	—5½		14,90*,000	7 n. c.	1¾ Q.	May, 1907
Cambria Steel	30¼	— ¼	March 19	45,000,000*	6	1½ S. A.	Aug., 1907
Cambria Iron	43	—1		8,468,000*	4	4 S. A.	Apr., 1907
Chicago Pneumatic Tool	37⅞	.....	Feb. 18	6,145 800	4	1 Q.	July, 1907
Colorado Fuel	23½	—2⅝	Oct. 21	30,132,000		.....	Apr., 1902
Crucible Steel	6¼	—1⅛	Oct. 16	24,578 400		.....	.....
Crucible Steel pr	61¼	—5¼		24,436,500	7 cum	6	Mar., 1907
Empire Steel	8	.....	Feb. 27	2,281,400		.....	.....
Empire Steel pr	58	.....		2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	100	.....	Feb. 19	1 000,000	6	1½ Q.	May, 1907
Fay & Egan pr	128½	.....		1,000 000	7 cum	1¾ Q.	May, 1907
General Electric	124	—6¼	May 14	63,643,600	8	2 Q.	July, 1907
Harbison-Walker	1⅓	.....	Jan. 21	18,000,000	6	.....	.....
Harbison-Walker pr	71½	—1¼		9,600,000	6 cum	1½ Q.	July, 1907
International Pump	21½	—1	June 4	17,762,500		2	Apr., 1905
International Pump pr	75½	.....		11,350,000	6 cum	1½ Q.	Aug., 1907
Lackawanna Steel	52	.....	March 13	34,971,400		.....	.....
Lake Sup. Corp	7	.....	Oct. 2	40,000 000		.....	.....
New York Air Brake	102⅞	—12½	June 18	10,000,000	8	8	Apr., 1907
Niles-Bement-Pond	130	.....	Feb. 6	5,000,000	6	6	Mar., 1907
Niles-Bement-Pond pr	105	.....		2,000,000	6 cum	1½ Q.	Aug., 1907
Otis Elevator Co	30	.....	March 18	6,350 300		3 A	Apr., 1907
Otis Elevator Co. pr	88	—1		6,308 500	6 n. c.	1½ Q.	July, 1907
Penn. Steel	60	.....	May 13	10,750,000		.....	.....
Penn. Steel pr	100	.....		16,500,000	7 n. c.	3½ S. A.	May, 1907
Pittsburg Coal Co	8	—2	Feb. 11	32 000,000		.....	Nov., 1906
Pittsburg Coal pr	50	— ½		32,000,000	7	.....	Apr., 1905
Pressed Stl. Car	28¼	—1¼	Feb. 20	12,500,000		3	Aug., 1904
Pressed Stl. Car pr	85	—4		12,500,000	7 n. c.	1¾ Q.	May 1907
Pullman	154	—6	Oct. 17	100,000 000	8	2 Q.	Aug., 1907
Railway Stl. Spring	33½	—4½	March 7	13 500,000		4 S. A.	Mar., 1907
Railway Stl. Spring pr	87	—2¾		13,500,000	7 cum	1¾ Q.	June, 1907
Rep. Iron & Steel	19⅛	—1¼	Oct. 9	27.191,000		.....	.....
Rep. Iron & Steel pr	69¼	—10¼		20,416 100	7 cum	1¾ Q.	July, 1907
Sloss-Sheffield	46½	+1½	March 5	10,000,000	5	5	June, 1907
Sloss-Sheffield pr	95	.....		6 700,000	7 n. c.	1¾ Q.	July, 1907
Tenn. Coal & Iron	135	—5	May 7	22.553 060	4	1 Q.	Aug., 1907
U. S. Pipe & Fdy	28¼	—3¼	June 26	12 500,000	4	1 Q.	June, 1907
U. S. Pipe & Fdy. pr	78¾	.....		12,500 000	7 n. c.	1¾ Q.	June, 1907
U. S. Steel	30¼	—1½	April 15	508,302 500	2 n. c.	½ Q.	July, 1907
U. S. Steel pr	92⅜	—3⅜		360,281.100	7 cum	1¾ Q.	June, 1907
U. S. Steel 5's	91	—5		463.798 000	5	5 A.	.....
Va. Iron, Coal & Coke	50	—10	Sept. 17	8,641,600		.....	.....
Westinghouse Elec	138	—6½	July 24	24 998.700*	10	10	Apr., 1907
Westinghouse Air Brake	141	—4	Oct. 1	11,000,000*		22½	Jan., 1907

Par value of shares, $100, except those starred (*), $50.

Financial Notes.

The quarterly report of the Sloss-Sheffield Steel & Iron Co., for the period ended July 31, shows net earnings of $429,895 for the months of May, June and July. The dividends on the preferred stock amount to $114,000 and on the common stock to $129,000, leaving the surplus for the quarter $186,895.

Recent dividend declarations include the following: Sloss-Sheffield Steel & Iron Co., regular quarterly dividend of 1¾ per cent on its preferred stock and the regular quarterly dividend of 1¼ per cent on the common stock, payable Aug. 31; Barney & Smith Car Co., regular quarterly dividend of 4 per cent on the preferred stock, payable Sept. 1, and the regular quarterly dividend of 1 per cent on the common stock, payable Sept. 16; Fay & Egan Co., regular quarterly dividend of 1½ per cent on the common stock and an extra dividend of 2 per cent and the regular quarterly dividend of 1¾ per cent on the preferred stock; Bird Iron Co., dividend of 50 per cent, making 70 per cent in dividends this year.

NEWS FROM MANY INDUSTRIES

New Buyers:—

The Dayton Foundry Co., Dayton, O., capital $50,000, has been formed by C. E. Pease, A. H. Kemper, Charles Seybold, O. O. Ozias and H. E. Talbott.

James F. McElroy, Alfred W. Henry and Maurice D. Leehey have organized the Cascade Steel Foundry Co., of Seattle, Wash., with a capital of $200,000.

James L. Beck, P. M. Moore, L. C. Shaw, J. W. Stanton and J. F. Wagner have incorporated the Warsaw Wire Fence Co., Warsaw, O., with a capital of $25,000.

The Michigan Grey Iron Casting Co., Detroit, has been organized with a capitalization of $10,000 by W. L. Coghlin, August F. Meyer and Peter Donnelly.

The Grip Coupling Co., Springfield, Mass., to manufacture patent pipe coupling, etc., capital $75,000, has been incorporated by J. C. Kehoe, Shrewsbury, and H. T. Merriam, Worcester.

The L. S. White Forging Co., Endicott, N. Y., hardware, has been organized by Leroy S. White, Lilian E. White and Charles E. White, Union, N. Y., with a capital of $50,000.

The Fay Machine Tool Co., Philadelphia, has filed articles of incorporation with a capital of $50,000. Those interested are: Otto W. Schamm, R. C. Fay and George W. B. Fletcher.

Articles of incorporation have been filed by the Western Rolling Mills Co., Denver, Colo., with a capital of $100,000. Those interested are: A. M. Smith, F. S. Rutherford and T. E. McIntyre.

The Stone Bros. Co., Detroit, has been chartered with a capital of $20,000 by William Stone, C. H. Junth and Nicholas Schwenter. The company will manufacture and deal in hardware and plumbers' supplies.

The Columbiana Foundry Co., Columbiana, O., has been organized with a capitalization of $10,000 by L. A. Woodward, S. W. Tidd, C. M. Young, J. R. Jeffrey and E. P. Tunkhauser.

Samuel E. Maylor, Henry Fries and George Hermann, Paterson, N. J., have organized the Universal Foundry Co., 138 Broad street, Newark, N. J., with a capital of $50,000.

The Gardner General Foundry Co., Gardner, Mass., has been chartered with an authorized capital of $50,000. The officers of the company are: President, E. B. Watkins; treasurer and clerk, Ralph W. Whiley, both of Gardner.

The Ferrofix Brazing Co., Charlotte, N. C., capital $25,000, has been formed by F. H. Bradley, L. E. Anderson and J. A. McRae to manufacture and repair by process of brazing and otherwise handle all kinds of machinery and supplies.

The Washington Tin Plate Co., Pittsburg, has filed articles of incorporation with a capital of $10,000. Those interested are: Richard W. Martin, W. Wallace Martin and John J. O'Connor, all of the address given above.

The Ansonia Brass Fitting Mfg. Co., Manhattan, N. Y., capital $15,000, has been formed by William Olderman, Sidney N. Israel and David S. Pine, all of 346 Broadway, New York City. The company will manufacture brass fittings.

The Ohio Gas Engine & Mfg. Co., Cleveland, has been organized with a capital of $100,000 by E. E. Kissap, G. W. Stone, J. L. Clark, R. H. McCracken and C. McElroy. The company will manufacture a patent gas engine and is now arranging to acquire a plant for its operations.

The Wiliamsburg Mfg. Co., Northampton, Mass., has been formed to manufacture tools, hardware, etc., with a capital of $50,000. The officers of the company are: President, Arthur J. Polmatier, Williamsburg; treasurer, Joseph J. Noonan, Springfield; and clerk, William C. Polmatier, Florence.

The United Expanding Bolt Co., Ltd., Brooklyn, N. Y., has been organized to manufacture nuts, bolts and screws, with a capital of $30,000 by George B. Martin, 253 Seventy-third street, Brooklyn; William A. Cooper, 336 Forrest street, Jersey City, N. J., and E. J. Mastaglin, 392 Decatur street, Brooklyn.

The Keilly Heater & Evaporator Co., foot of Grand and Sussex streets, Jersey City, N. J., has been chartered by George R. Warnew, Samuel B. Howard and John R. Turner, all as above, with a capital of $100,000. The company will manufacture and erect water heaters, evaporators, condensers, etc.

Articles of incorporation have been led by the Magee Coke Co., to operate in Mt. Pleasant township, Westmoreland county, Pa. The capital stock of the company is $100,000, and the officers are: President, W. C. Magee; vice president, J. W. Abraham; treasurer, I. W. Semans, and secretary, C. S. Bygate, of Pittsburg.

The Rickersburg Brass Co., Cleveland, has been organized with a capital of $50,000 by Emanuel, David L., Solomon and Sidney Rickersburg and Joseph J. Klein to manufacture plumbers' and water works supplies and specialities. The company is now negotiating for a site upon which to erect a plant for its line of manufacture. Emanuel Rickersburg, formerly president of the Atlas Brass Mfg. Co., Cleveland, manufacturer of plumbers' supplies, will be the president of the new company, and Lawrence Rickersburg, who was also formerly with the Atlas company, will be the vice president and secretary. The company has opened a temporary office at 2100 Viaduct Power building.

New Construction:—

The University of Colorado at Boulder has awarded the contract for new engineering shops which will be used in promoting the technical instruction of that institution.

The Great Falls Iron Works, Great Falls, Mont., is planning the erection of a new machine shop, 50 x 70 feet, which will double the present capacity. Modern equipment will be installed.

Plans have been completed for the erection of machinery and storage building for F. W. Bird & Son, East Walpole, Mass. The project includes machinery building, storage building and engine house.

The Alabama & Georgia Iron Co., Cedartown, Ga., is erecting 10 80-cord charcoal ovens at that place. The work is being done by George Trammell, of Rome, Ga. A. Griggs is president.

The Ferguson & Lange Foundry Co., Clybourn avenue and Willow street, Chicago, has begun work on the reconstruction of its foundry which was recently damaged by fire. The building will be a two and a half story structure of brick and stone.

Charles H. Evered, interested in the Wright Foundry & Machine Works, Superior, Wis., is about to have erected a new plant for that company. The plans call for a building 105 x 150 feet to contain a machine shop and iron foundry, a brass foundry and a blacksmith shop.

The city of Waterloo, Ia., by agreeing to furnish a site and erect build-

ings, has attracted to that city a new malleable iron foundry. The contract for the erection of three buildings, 75 x 400 feet, 75 x 120 feet, and 50 x 100 feet, upon a tract of five acres, has been let to Contractor George F. Scales, of Waterloo.

The Novelty Iron Works, Sterling, Ill., has just completed and occupied a new building which replaces an old structure which was damaged by fire. The new building is 54 feet wide, 136 feet long on the west side, and 146 feet long on the east side. A portion of the building is two stories, but the remainder is one story.

The Bollman-Wilson Foundry Co., Cincinnati, whose pattern storage room was damaged by fire Aug. 7, has let the contract for the rebuilding of the damaged portions of its plant and the work is now partly under roof. The company was not compelled to lose any time in its operations on account of the fire, and reports that it can fill all orders.

R. & S. Sollitt, 612 Pullman building, Chicago, are the contractors in charge of the constuction of an erecting shop to be built for the Sullivan Machinery Co., of that city, in connection with its large manufacturing plant, 1157-1167 Fulton place. The building will cover 138 x 161 feet and will be 42 feet high with concrete foundation, brick and steel superstructure and composition roof.

Hubbard & Co., Inc., Lawrenceville, Pa., manufacturers of shovels, have restored the buildings of their plant which were destroyed by fire some time ago. In addition the company is planning the erection of a warehouse 88 x 88 feet, forge shop 87 x 87 feet, threading shop 87 x 87 feet, engine room 30 x 50 feet, and a machine shop 30 x 80 feet. The new buildings will be of steel, frame and brick construction.

W. H. Sawyer & Sons, Americus, Ga., manufacturers of Sawyer-Fulford revolving scales and sacking machines, will erect a foundry, 70 x 90 feet, for the manufacture of the castings required in the production of their machinery. A 36-inch cupola will be installed and in view of the fact that the sections will be small, no cranes will be used. The entire equipment will be purchased locally.

The Turner Brass Works, Chicago, has completed its new factory at Sycamore, Ill., and is now occupying it. The main factory building has a floor space of 40,000 square feet, with power and heating plants in addition. Improved machinery has been installed and the facilities of the company greatly enlarged. The plant is located on the main line of the Chicago & Great Western railway and the Galena division of the Chicago & Northwestern railway with side tracks to the factory. The main office is now located at Sycamore.

The Illinois Corrugated Metal Co., Bloomington, Ill., manufacturer of galvanized corrugated metal culverts, is erecting an addition 48 x 120 feet, and by the installation of new machinery and the employment of a larger working force expects to more than double its present capacity. The company anticipated a large increase in business this year, and doubled its former capacity April 1. The patronage, however, has exceeded all expectations, necessitating additional buildings. The addition under construction is a one story frame with composition roof. W. M. Belt is president and manager.

General Industrial Notes:—

The Hall Gas Engine Mfg. Co., Waukegan, Ill., has increased its capital from $10,000 to $25,000.

The Jackson Iron & Steel Co., Jackson, O., has filed notice of an increase in the capital stock from $150,000 to $200,000.

The capital stock of the Niles Corrugating Co., Niles, O., has been increased from $50,000 to $100,000. F. J. Thomas is president and C. G. Thomas, secretary.

The Bovard & Sefang Mfg. Co. reports that the fire which damaged its interests at Butler, Pa., was confined to a small warehouse. The company will not rebuild at present. The plant of the concern is located at Bradford, Pa.

Production was begun Aug. 14 in the new Saucon plant of the Bethlehem Steel Co., South Bethlehem, Pa. Two of the 10 new 50-ton openhearth furnaces were put in operation and the steel made in them. Five additional furnaces will be in working order by Sept. 1.

Among the increases of capital by Pennsylvania corporations are the Philips Pressed Steel Pulley Works, Philadephia, from $5,000 to $550,000; the Blaisdell Machinery Co., Pittsburg, from $200,000 to $300,000; the Moris Metallic Packing Co., Philadelphia, from $20,000 to $30,000.

The Warren Stove Co., Warren, O., successor to the Warren Steel Range Co., has elected the following officers: President, H. C. Bradley; vice presidents, Isaac Kirk and William Wallace; secretary and treasurer, W. J. Masters; general manager, W. Jameson.

The Viking Shear Co., Erie, Pa., recently chartered, is manufacturing the "Viking" compound leverage portable shears and rod cutters. The company contemplates occupying a plant of its own, but is not ready to make any definite announcement along this line. E. E. Walker is president and H. L. Walker, secretary.

The Gschwind Furnace Co., Youngstown, O., has organized by the election of Dr. William Ranz, of Youngstown, as president, and Henry Karcher, of Youngstown, as secretary and treasurer. The directors are: J. S. Woodruff, of Salem, O., Dr. William Ranz, Henry Karcher and Leon and Karl Gschwind, of Youngstown.

At the meeting of directors of the Findlay Foundry & Machine Co., Findlay, O., E. C. Taylor and W. E. Gorrel were re-elected president and vice president respectively, and H. C. Miley was chosen secretary and treasurer, succeeding D. H. Thomas. The plant of the company was recently placed in the hands of a receiver, but it is reported that this action was taken preliminary to starting a new industry.

The Air Pump & Meter Co., Bradford, Pa., recently chartered, is manufacturing an air pump head for use in pumping oil and gas wells with compressed air and other fluids. The pumping head is attached directly and adjustably to the tubing of the well and operates automatically in axial line therewith, the motive force being the compressed air or other elastic fluid. The company is also manufacturing a new gas meter of a new design. Edwin E. Tait is secretary and treasurer.

The Buss Machinery Co., Muskegon, Mich., manufacturer of woodworking machinery, has purchased the land and building partially occupied by it and formerly used as the plant of the Davies Foundry Co. The site is 132 x 140 feet and includes a four story wooden structure besides a brick machine shop, foundry and other buildings. The growth of business necessitated the acquirement of larger quarters and the property has been purchased also with the view of erecting additional buildings when they are needed.

The Adjustable Steel Centering Co., Fond du Lac, Wis., recently organized reports that it is in the market for shearing, cutting, punching and stamping machinery, lathes, etc., for

equipping its plant. The company will manufacture an adjustable steel center used in the building of all brick or concrete work such as sewers, manholes, culverts, cisterns, conduits, tunnels, etc. The center is adjustable both as to size and shape and is contractable in an instant for immediate removal from the work. J. E. Hennen is president, H. T. Sackett, vice president, and J. E. Dooley, secretary and treasurer.

The Virgo Tool Steel Co., Oakland, Cal., recently organized, is preparing to place on a commercial basis the inventions of A. H. Newman, which include a special process for manufacturing tool steel, known as the Virgo process, furnaces for the same and machines to manufacture files. The company now owns a plant for manufacturing the steel on a small scale and has placed some stock on the market to secure a financial backing for developing its products. The officers of the company are: A. H. Newman, president, Wm. Ingram, vice president, Leonard Thomas, secretary and treasurer, and these with George B. Ogden and Herbert D. Wise, all of Oakland, constitute the board of directors.

H. Stuart Hotchkiss and Frederick B. Farnsworth, receivers of the National Wire Corporation, New Haven, Conn., have been authorized by the Superior Court to turn over the assets of the corporation in their possession to the trustees appointed by the bankruptcy court. The transfer of the assets is subject to one reservation, that the $19,714 held under garnishee in the suit brought by Everitt Webster, one of the creditors, be withheld to await the outcome of the case. The final accounting of the receivers was presented and approved. It dates to July 31 from the date of the receivership last December, and shows receipts of $451,196.84 and disbursements of $259,689.85, leaving a balance on hand of $191,479.99. The assets of the concern are given as $4,219,689.30, of which $1,167,525.48 is in actual property.

Trade Notes:—

On account of the increased business of the Dayton Pneumatic Tool Co., Dayton, O., in the Buffalo district, an agency has been established with Root, Neal & Co., 178-180 Main street, Buffalo, N. Y. The latter concern will carry in stock a complete line of "Dayton" and "Green" pneumatic hammers, as well as repair parts and accessories.

Geo. F. Adams, for 10 years in charge of the sales work of the Westinghouse Electric & Mfg. Co., in the Cleveland district, and James R. Downs, for 11 years in charge of the industrial power work of the same company, have resigned their positions and formed the firm of Adams & Downs, with offices at 713 New England building, Cleveland. The firm will give its sole attention to representing the Burke Electric Co., Erie, Pa., in the Cleveland district, which comprises the greater part of the state of Ohio, and will carry a full line of both direct and alternating current motors and generators for industrial and other uses.

Fires:—

The storehouse of the Erie railroad machine shops at Susquehanna, Pa., were destroyed by fire Aug. 13, but the adjacent shops were saved. The loss was heavy.

The Bellows Falls Machine Co., Bellows Falls, Vt., suffered a loss of about $2,000 Aug. 14 from a fire which damaged the building in which it was located. Insurance is ample.

FOREIGN TRADE OPPORTUNITIES.

(These inquiries from prospective foreign purchasers are furnished by American consuls to the Government Bureau of Manufactures, Department of Commerce and Labor. Those in which the addresses are omitted are on file at the Bureau of Manufactures, Washington, D. C. In applying for addresses refer to the file number.)

No. 1257. Cranes.—No term tenders are invited by the Belgian government for six 2-ton cranes for the Canal Company. Address Societe du Canal et des Installations Maritimes de Bruxelles, Brussels, Belgium.

No. 1288. Cotton oil machinery.—A company has been formed in India to manufacture cotton seed oil, and has not yet decided on the make of machinery to be adopted.

No. 1305. Railway construction.—An American consular representative in a Spanish American country writes that concessions have been granted to six parties, whom he names, and that they are building or contemplate building railroads.

No. 1307. Chinese railroad construction.—Consul H. L. Paddock writes from Amoy, China, that the purchasing committee of the new Amoy-Changchow line of the Fukien railroad is composed of two Manila Chinese who are friendly disposed toward America and American things, and there is an opportunity for American manufacturers of railroad materials, rolling stock, and appliances. He states that prompt action by American firms will obtain contracts for all these supplies and the equipment. Work has actually commenced.

No. 1310. Panama Canal supplies.—Sealed proposals, in triplicate, will be received at the office of the general purchasing officer, Isthmian Canal Commission, Washington, D. C., until August 26, 1907, for furnishing six steel barges. (Circular 383.)

No. 1320. Iron gas piping.—A firm in southern Europe has requested an American consul to have manufacturers (not dealers) of iron gas piping communicate with them, quoting prices and terms, and forwarding catalogs.

No. 1325. Cast-iron pipes.—An American consul-general in South America furnishes the names of dealers in cast iron pipes. He also gives the name of the municipal engineer of a city which will shortly advertise for bids for the installation of a system of drains and sewers.

TRADE PUBLICATIONS.

Electric Pyrometers.—William H. Bristol, 45 Vesey street, New York, has issued catalog No. 17, 9 x 12 inches, 40 pages. This catalog gives a general description of Bristol's low resistance pyrometer, both of the indicating and recording types for all ranges of temperature up to 3,000 degrees Fahr. In addition, there is included in the catalog illustrated descriptions of several ways in which the instruments can be practically applied for commercial service. Sample records are presented, together with specimen scales used on the instruments. A long list of users is also incorporated, together with an information sheet to be used as a basis for quotations on special equipment. A copy of the catalog will be sent to all interested on application.

Molding Machines.—The Arcade Mfg. Co., Freeport, Ill., is distributing a catalog 6 x 9 inches, 12 pages, illustrating the "Modern" molding machine No. 2. This machine is designed to handle light castings, such as are usually made in flasks 14 x 22 inches or less. It is in successful operation in brass, malleable iron and gray iron foundries and is doing a large variety of work with great success.

Pattern Making Supplies.—The Cleveland Fillet Co., Cleveland, in a catalog 6¾ x 5¾ inches, 16 pages, describes a large list of pattern-making supplies, including the Crescent leather fillet, hard wood dowel pins, pattern letters and figures, rapping plates, metal joint fasteners, fillet tools and the new Foley saw filing and jointing machines.

Steam Engines.—The Ball Engine Co., Erie, Pa., describes its line of engines in a recently issued folder, which presents illustrations of the single-cylinder, side-crank engine, tandem compound, side-crank engine, cross-compound, side-crank engine, direct-connected, horizontal single-cylinder Corliss engine, horizontal cross-compound Corliss engine and vertical cross-compound Corliss engine, the three latter having improved valve motions. In addition to the descriptions of the engines, the various details, such as Corliss valve gear, connecting rods, bearings, cross heads, governors and oiling systems are described.

Insulator Supports.—The Electric Controller & Supply Co., Cleveland, is distributing a neat brochure illustrating the universal insulator support. As the name implies the supports can be used in any position, on the flanges of any rolled structural shape, round, square or flat bars, gas and water pipes, edges of tanks, plates, etc. They are made in four sizes ranging from one to 2½ inches by ½-inch steps.